Journal of Engineering and Applied Sciences 13 (7): 1584-1589, 2018
ISSN: 1816-949X

Increase of Efficiency of the Use of Transit Potential of Kazakhstan of Republic

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Abstract: The content of the study includes data on a condition of park of lorries, roads of the international cargo transportation of the Republic of Kazakhstan. Possibilities of usage of regional motor transport of the republic for transit transportations are considered. There is a development of the technique of decision-making on a form of performance of the international and transit transport with use of local motor transport.

Key words: Increase, efficiency, use, transit potential, Republic of Kazakhstan, transport

INTRODUCTION

Having gained political and economic independence of Kazakhstan became the full subject of the international economic relations: expanded a range of the partner-countries, established economic relations with many developed and developing states, reorganized the relations with former partners, improved in integration into the world market.

Geographical position of Kazakhstan, the big area, small population density, huge stocks of minerals, remoteness of the country from maritime routes an not concentrated position of production and consumption places of the goods on the big area cause great demand for land transportation.

Achievements in economic development in many aspects became possible because of successful development of budget developing and allocation branches of economy of the republic which first of all includes the transportation branch.

MATERIALS AND METHODS

Within the last decade of Kazakhstan became the active participant of world integration processes. An important element of economic integration is the qualitative transport infrastructure providing internal and transit transportation of goods and passengers with high level of service.

Today, transport is not only the branch satisfying existing requirements for transportation of cargoes and passengers but also, interbranch system, changing managing conditions.

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Table 1: The amount of lorries, depending on the technical performance of the brand

Lorries	Amount	Percentage
Distribution on categories of Euro (Euro-0)	685	12.8
1	260	4.8
2	2550	47.7
3	1504	28.0
4	297	5.5
5	65	1.2
Distribution by the brands of cars		
Mercedes-Benz	888	16.6
LAN	897	16.7
IVAEI	258	4.8
VOLVO	1758	32.9
SCANIA	312	5.8
Renault	426	8.0
DAF	651	12.1
D. Chrysler	37	0.7
KAZAZ, MAZ	66	1.2
The rest	68	1.2
Total	5361	-
On the balance	2173	40.5
Rented	3188	59.5

There for the urgency of improvement of management of all part in the international cargo transportation auto transport with use of transit potential of Kazakhstan for development of economy of its regions is absolutely possible.

As a result of conducted analyses of an existing situation in performance of transit and international auto transportations were defined the main problems which regions face: absence or insignificant share of participation of a moving stock of the local auto transportation enterprises in performance of transit and international transportations including international corridor "Western China-Western Europe". For high performance of the international and transit transportations lorries should correspond the requirement of neighboring states. Unfortunately, the technical condition of vehicles station of Kazakhstan has poor performance. Table 1 shows data on lorries of the auto transportation enterprises of the Kyzylorda area involved for international transportation, allocated by brands and a technical condition for 01.01 2010 (Ahmetov, 2010).

According to the Table 1, only 6.7% of cars of transportation enterprises correspond the requirement of Euro-4 and 5. Considering that the market of transport services of the international automobile transport is in conditions of the high competition between it's participants and the Chinese party doesn't open way for our carriers, 6.7% of cars can go to Russia or through Russia (Fig. 1).

Transit transportations through the territory of Kazakhstan are carried out generally by transporters from Kyrgyzstan 10.5%, Uzbekistan 5.5% Russia 3.6% and of Kazakhstan 85% of the Chinese cargoes.

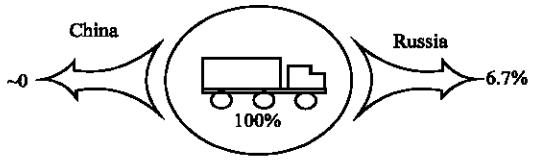

Fig. 1: Conditional possibilities of regional ATT in performance of the international and transit auto transportations

For the one Summer month through of Kazakhstan from abroad pass 1500 buses and 8500 lorries. About 10% from them have an overload (over 10 ton an axis and more than 40 ton of gross weight) (Anonymous, 2004).

On the other hand, the condition of highways is characterized by low bearing ability of roads cover. About 23% of republican roads are in an unsatisfactory condition and only 20% can be defined as rather strong. For further development of technical and economic reforms in road branch and for the purpose of improvement of a network of public roads and the maximum satisfaction of requirements of national economy in auto transportation, the Government of Kazakhstan accepted the program of development of road branch for 2006-2012. The total amount of financial resources for implementation of this program is 1283 billion tenge including: 830 billion tenge from the republican budget on roads of republican value; 271 billion tenge from local budgets and target transfers from the republican budget on roads of regional and regional values. Thus, the main problem is the solution of questions of financing of keeping highways in good condition and repair of highways from the local budget.

RESULTS AND DISCUSSION

Increase of efficiency of use of a moving stock of the regional motor transportation enterprises on international and transit transportations is possible with uses of modern information systems of an operational management in processes of transportations and providing continuous, rhythmical and mutually agreed research of all parts of a chain of delivery of cargoes.

There are serious problems in attraction of a moving stock of Kazakhstan motor transportation enterprises for implementation of the international and transit transportations for the purpose of usage of a local human resources and to increase financial investments in the regional budget. The international transit corridor "Western China Western Europe" passes through the five areas of Kazakhstan. Far location of highways from rural areas is a basis for the stable life of people in these areas (Fig. 2).

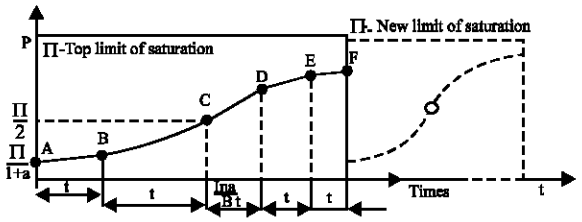

Fig. 2: S-shaped symmetric curve of saturation of the market by logistic services

In this regard increase of efficiency of using local vehicle stations by the international and transit transportation is one of the main components for development of regions. Extensive information which is defined by requirements of economic model of an assessment of efficiency of HDM offered by the World bank is necessary for performance of this research.

The transport and operational characteristics provided by the HDM-IV program are grouped in the form of 4 complexes:

- Main characteristics
- Data on use of vehicles
- Individual quotations
- Unessential characteristics

Information on types of cars and their characteristics was received from results of carrying out the accounting of structure and intensity of movement. Data on cost of cars, tires, spare parts, combustive-lubricating materials, on terms of payment of research of drivers and mechanics were received by a questioning of drivers, mechanics, dealers and other employees of the motor transportation, trade, intermediary organizations, filling stations, service stations.

Received information was written down in specially developed tables of a database in which are considered specially calculated factors for receiving the general annual charges on the maintenance of motor transport. These factors differentiated on brands of cars, represent total transport operational costs in dollars on km, taking into account a technical condition of the highway and for each concrete period of time within term of an assessment of economic efficiency of operation of cars.

The concept of the organization of transit transportations became simpler as a formula "In the right place-in due time-with the minimum expenses" as for delay or delays penalties were calculated generally from number of the delayed days in a way. The average size of penalties paid off with the accounting of character of transported cargoes and their distributors and also the sizes of cars, their loading capacity were considered also. As a result, the following figures expressed in dollars on a business hour of the car were received: 6.19, 8.25, 9.0, 10.63 for 2-5-axis trucks, respectively (Zhanbirov, 2008).

Data, obtained at the same time was checked on the following empirical formulas from the international practice in particular for heavy trucks:

$$0.60+0.025\cdot|R|+0.00025\cdot|R|^2 \quad (1)$$

In $|R|$ formulas the international indicator of flatness. All data turn out in dollars per km. Formulas are applicable for $|R|$ values no more than 11.5.

We offer a technique of decision-making on a choice of a form of performance of the international and transit automobile transportation with use of local cars. As the basic principles which are allocated the following:

- Service of cargo transportations as strategic element of system of ensuring competitive advantage of the enterprise and local budget
- Need of achievement of high level of integration between partners in chains of deliveries, creation of the new organizational relations
- Synchronization of processes on the basis of a common information space
- Use of modern technological possibilities for management of chains of the international and transit deliveries

The main condition of the successful organization and management of a transit stream on the offered scheme is on-time transportation by replaceable carrying cars of the loaded international container trailer. The container trailer, loaded outside of the republic is delivered to Kazakhstan border, the container trailer passes with a mark through customs and boundary posts without examination and check with the initial accompanying document and is transferred to of Kazakhstan carrying car, i.e., the trailer with cargo passes through border and carrying cars change, through each 350-400 km.

Moreover, custom and boundary posts of the concrete state on accompanying documents of the container trailer note following data. The main information, noted and supervised on boundary and customs posts:

Indicators:

- Check place, time data
- Registration number of the trailer or semi-trailer
- Shipper (state, city)
- Receiving country
- Total weigh
- Initial weigh 4 first numbers
- Initial weigh on axis
- Transferredinformationnumber

The local auto transportation enterprises which can offer the acceptable price for transportation and the complete set of services including exact time of giving of the car, informing of the client on a site of the car and a planned arrival time to the place of transfer to the following carrier, a customs post or unloading participate in a chain of deliveries (Andonie and Dzitac, 2010).

In these conditions, the auto transportation and forwarding enterprises for successful research should reconsider relationship system with clients and organize the research, so that, there was priority a satisfaction of inquiries of customers and the accurate organization of an operational management process of delivery of cargoes.

For this purpose, as methodological tools of receiving limiting parameters may be used curves of saturation which are used also for studying dynamics of life cycles of products or services. The most known curve are symmetric S-shaped Pearl curve (Beile *et al*., 2004):

$$P = \frac{\Pi}{1 + ae^{-bt}} \quad (2)$$

And S-shaped asymmetrical curve:

$$P = \Pi \cdot e^{-ae^{-bet}} \quad (3)$$

Where:

Π = Established top limit of saturation of transport services or a share in the market
a = The dimensionless constant characterizing shift of a curve to the right or to the left
b = The constant measured in units divided on time, characterizing a curve inclination
e = Natural logarithm, equal 2.72
t = Time during which is considered saturation by transport services, temporary measuring instruments

The first curve is characterized by a symmetric point of an excess with coordinate Ln a/b on an axis X and the market of services or a share in the market of transport services is defined by coordinate $\Pi/2$ on axis Y at. At t = 0 the market of services is defined by size $\Pi/(1+a)$. The second, asymmetrical S-shaped curve is characterized by an excess point with coordinate t = a/b on an axis t and in coordinate I/e on P. With t = 0 the market of transportation services is equal P = Π/ea. Both curves asymptotically come nearer to extreme values of the market of the transport services, equal 0 and Π. At the same time on these curves, it is possible to investigate change of size of the market of transport services in time: origin (A-B), growth acceleration in process of expansion of volume of transit transportations and technological processes (B-C), delay of growth (D-E) and attenuation (E-F). From data of drawing it is also possible to reveal that on a new time interval is possible emergence of a new limit of saturation of transport services-Π.

Chosing brand and type of cars for transportation of cargo it is necessary to plan internal supplying and transport possibilities of the motor transportation enterprise correctly. As participants of the international and transit transportations bears the international responsibility in a chain of deliveries therefore the formed volume of services and their structure in the maximum degree should correspond to solvent demand of served clients and requirements of own enterprise, participants of transportations should provide high efficiency of economic activity of the enterprises. Maintenance of reserve funds (financial, spare parts and units, fuels and lubricants, etc.) is the key parameter for providing high technical readiness of vehicle station (Fortnow, 2009):

$$Q_a = Q_m \cdot x \cdot t_{me} \quad (4)$$

Where:

Q_a = Volume of technical and ATT technological reserve fund
Q_m = Volume of daily average consumption of fund for ensuring continuous research of a moving stock of ATT
t_{me} = Period of time of replenishment of reserve funds

The total cost of transportation research or operation of the car is defined depending on various factors (Fig. 3), in particular in the generalized look it is possible to present it on a equation:

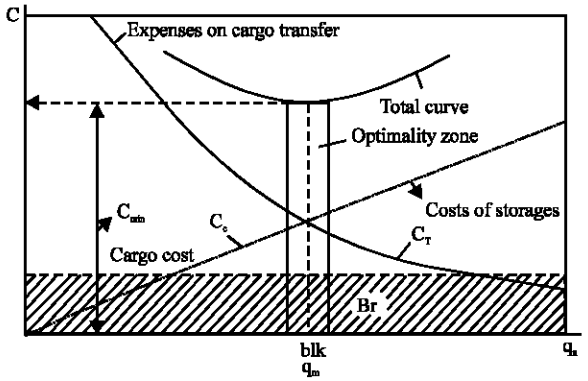

Fig. 3: Dependence of expenses on the size of technological reserve funds (Harrison, Uolson's Model)

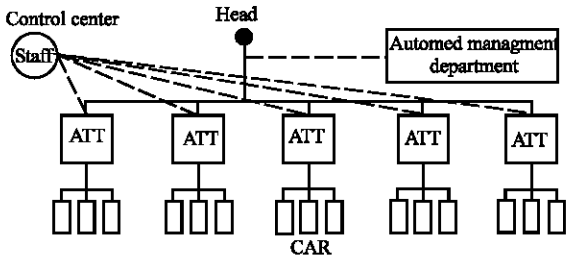

Fig. 4: Vertically horizontal structure of management of the external center of general usage

$$TR = T_i + K_z + T_b + C_c + T_a + T_s \quad (5)$$

Where:

T_i = Price of transportations by an i type of the car
κ_z = Cost on cargo storage in intermediate warehouses
T_b = Cost of intermediary services
C_c = Cost of insurance
T_a = Cost of information and technological services in a chain of deliveries
T_s = Amount of customs cost and duties (Kayongo and Helm, 2012)

Reliability of managing presented structure of management of transit delivery may be described depending on quantity ($C_к$) participating to quantity (C) wishing auto transportation enterprises to participate in a chain of deliveries:

$$C_u = C_к / C \times 100 \quad (6)$$

All processes are operated, supervised by the main organizer (head) of transit transportation (Fig. 4) (Beile *et al*., 2004).

Traditionally, the operational management was understood as process of direct response to the arisen situation. However, often these reactions, owing to a number of circumstances including absence of necessary current information, can't bring expected effect and operatively to lower a sharpness of the arisen problem. Present progressive technologies allow to change qualitatively a situation, creating conditions for implementation of continuous operative reaction behind process of performance of transport operation in a real mode of time.

In particular on Fig. 5, the transit stream of cargo according to the offered scheme in China-Kazakhstan-Russia direction is presented. The general extent of a transit corridor makes 8425 km including 2887 km across of Kazakhstan.

Fig. 5: Distribution of extent of the highway on a transit corridor "the Western China-Western Europe"

For concrete calculation cargo moving from the city of Urumqi (China) to border with Russia is accepted. Based statistical and biographical data, duration of passing of intermediate checks, registrations, loadings unloading on borders on this part of a way varies from 24-36 h.

On Fig. 6 are presented the intermediate technological processes which are carried out on this piece of a way at the present time (Wainer *et al*., 2011). There for, for increase of efficiency of transit transportations it is necessary to reduce labor input and duration of intermediate technological processes. As efficiency of transportations depends on quantity, quality and duration of performance of these processes:

$$T = t_1 + t_2 + t_3 + \cdots + t_i \quad (7)$$

Where:

T = Initial duration of performance of intermediate technological processes
t_i = Duration of performance of i process

As it is presented on Fig. 6, each intermediate technological process depending on various factors can be carried out differently, therefore, average values are accepted for calculation:

$$T_{tp} = (T_{min} + T_{max})/2xN \quad (8)$$

Where:

T_{min}, T_{imax} = Minimum and maximum values of time of performance of i technological process
N = Number of intermediate technological processes in considered option 8

During organizing transportation by the offered option all intermediate technological processes disappear and it is possible to present duration of transit transportation in the next type:

$$T_p = L/V_e + A_n x t_n \quad (9)$$

Where:

A_n = Amount of involved carrying cars
t_n = Time or duration of reception and the preparing of the transit container trailer 15-20 min

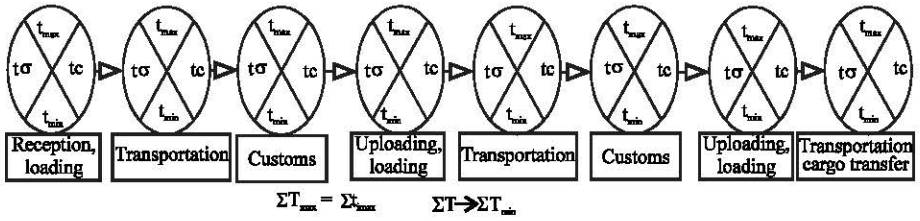

Fig. 6: Intermediate technological processes in a chain of transit delivery

CONCLUSION

The analysis of use of transit capacity of the Republic of Kazakhstan on the international corridor "Western China Western Europe" allowed to establish the reasons of impossibility of participation of Kazakhstan auto transportation companies.

There is a presentation of the new scheme of a transit stream of cargo in the China-Kazakhstan-Russia directions with use of the international transit container trailers allowing the Kazakhstan carriers to use the auto transport as carrying cars on the international corridor "Western China Western Europe" in the territory of Kazakhstan (Walcott, 1994).

REFERENCES

Ahmetov, Z.K., 2010. Problems of the organization of the international autotransportations. Intl. Automobile Transp., 23: 35-37.

Andonie, R. and I. Dzitac, 2010. How to write a good paper in computer science and how will it be measured by ISI web of knowledge. Intl. J. Comput. Commun. Control, 5: 432-446.

Anonymous, 2004. Kazakhstan and China today: New traditional factors of relationship. The Ministry of Foreign Affairs of the Republic of Kazakhstan, Almaty, Kazakhstan.

Beile, P.M., D.N. Boote and E.K. Killingsworth, 2004. A microscope or a mirror?: A question of study validity regarding the use of dissertation citation analysis for evaluating research collections. J. Acad. Librarianship, 30: 347-353.

Fortnow, L., 2009. Viewpoint Time for computer science to grow up. Commun. ACM., 52: 33-35.

Kayongo, J. and C. Helm, 2012. Relevance of library collections for graduate student research: A citation analysis study of doctoral dissertations at Notre Dame. Coll. Res. Libraries, 73: 47-67.

Wainer, J., H.P. De Oliveira and R. Anido, 2011. Patterns of bibliographic references in the ACM published papers. Inf. Proc. Manage. Intl. J., 47: 135-142.

Walcott, R., 1994. Local citation studies: A shortcut to local knowledge. Sci. Technol. Libraries, 14: 1-14.

Zhanbirov, Z.G., 2008. Automobile Logistics. Nur-Print Publishing House, Almaty, Kazakhstan,.