A. Ishchenko, Master student
K. Kuzmin, Master student
O. Kravchenko, Dr.of Engr., Prof., research adviser
I. Melnychenko, lecturer, language advisor
Zhytomyr State Technological University

RESEARCH OF OPPORTUNITIES FOR DEVELOPMENT OF AUTOSERVICE ENTREPRENEURSHIPS ON HIGHWAYS

Several international corridors pass through the Zhytomyr region, one of which is highway M-06 of European route E40. After the reconstruction of the road its quality increased significantly and that helped to increase the average speed and to improve the comfort and economy of movement on the road. On the road its own infrastructure has appeared: gas stations, cafes, camping etc. And this means new vacancies and taxes to the state budget.

According to the recommendations of the European Agreement on International Transport and the Agreement on Trans-European highway, medium distances between roadside service facilities should be: canteens - 30 km; filling stations - 20 km; service stations - 50 km; parking lots - 100 km; hotels - 50 km; shops and toilets –every 15 km.

If Ukraine has extensive transport infrastructure and, being at the crossroads of the most important areas of world trade between Europe, Asia and other continents, it will have all the prerequisites for sustainable development of this sector in terms of balanced public policy.

In order to develop recommendations for the design (or reconstruction) of auto service entrepreneurships along the highways the factors affecting land area service centers were investigated. It was explored that for the optimal area for roadside facilities of freight servicecentres, we can take 1500 - 2500 m2, which is enough for 4-5 posts with additional facilities.

The calculation of the number of working positions for each individual case can be determined by the formula

$$n^r = k^{nr} \sum_{i=1}^{2} \left[\left(I_i^N \cdot I_i^{S_r} \cdot k_i^{ob} \cdot N_i^r \right) \Big/ k_i^u \cdot \pi \right], \quad (1)$$

where n^r is a number of working positions that are necessary to care for service centreterritory;

k^{nr} is an adjustment factor of regional structure, accounting of allowable saturation of auto service facilities in the area is given by an expert $\left(\sum_{i=1}^{R} k^{nr} = 1 \right)$;

$I_i^{S_r}$ is the index of change in the regional structure of the existing fleet of cars i – of the type for r – territory;

k_i^{ob} is the ratio of average service of cars of i-type;

N_i^r is the number of cars of i - type at r - territory;

k_i^u is the capacity utilization ratio for the cars of i - type;

π is the prognosticated standard of service, the number of cars per one working post.

For the development of freight service centers the investments as governmental programs for developing infrastructure and private entrepreneurs, as well as the investments by foreign auto companies which have an interest from sales and service of brand vehicles are necessary.

The investments (S) necessary to increase the service capacity can be calculated approximately using the average coefficient of capital intensity for creating a working post ($K_{C.F.}$) and ratio, which determines the required number of service centers posts located in the roadside area ($M_{CSC.P.Z.}$) by the formula:

$$S = K_{C.F.} \cdot M_{CSC.P.Z.} \tag{2}$$

According to the Bellman's principle of optimality, the management of investments for each year of service entrepreneurships must be built in such a way that the amount of income will be the highest at all the stages till the end of the investment process, including maximum income in the considered stage. Then overall functional management of investments will take the form:

$$W = \sum_{i=1}^{n} w_i = \sum_{i=1}^{n} \max_{x<=S} \left[P_i(x_i) + w_{i+1}(S - x_i)\right], \; npu \; x_n(S) = S, \tag{3}$$

Where w_i is a value of gain (income) derived from the sale of investments on the i-th year of CSC work;

$P_i(x_i)$is income from funds that was invested in the i-th company on the i-th year of work.

To achieve the greatest benefit of the company and meet the majority of customer needs for company service center, the following operations must be performed: car wash, station maintenance and current repairs, tire assembly work.

When formingthe warehouse of spare parts, planned costs for parts necessary for technical maintenance and replacementsmust be considered. One of the important quality characteristics of the CSC is the coefficient of technical readiness of vehicles, which is determined by i type details as a ratio of proper functioning time $t_{iwork}$to the amount of correct operation time $t_{iwork}$and forced idle $t_{irepairs}$of vehicle taken for the same calendar period.

Given the random nature of the values of these variables, they are taken as the average (for all vehicles of this type) in the expression for the coefficient k_i. Moreover, coefficient of technical readiness of entire vehicle k is determined on as the "weakest link" principle, i.e. as

$$k = \min_{0 \le i \le n} k_i \tag{4}$$

The calculation shows that the lack of details in a warehouse can make significant change in the coefficient of readiness and, thus, violate accepted in practice restrictions $k \geq 0{,}86$. That is why a problem of using criteria that reflect the storage of this typedetail at the warehousecomes up, especially as a real time of waiting spare parts may differ from the standard. As the example of changes in technical readiness of trucks Volvo FH 1242 the results (Table 1) about feasibility of storing spare parts at the warehouse was obtained.

Table 1.Calculation results ofstoring details feasibility determination of trucks Volvo FH 1242

Detail	Delivery time, hours	Cost, UAH.	Probability of refusal	Expediency
Airsprings	24	1364,7	0,0000759	Not to keep
Cable ABS	1	1000,00	0,0002526	Not to keep
Fanbelt	24	618,36	0,0000829	keep
Powerrelays	24	1600	0,0000940	keep
Wheelstud	24	170,74	0,0000951	keep
Generatorbelt	24	485,72	0,0000992	keep
Block EBS	336	7997,57	0,0001139	keep
Sensor ABS	24	692,81	0,0001266	keep

CONCLUSION: CONSIDERING THE DIFFICULT ECONOMIC SITUATION, THE DEVELOPMENT OF SMALL COST-EFFECTIVE csc SOLUTION IS REASONABLE. WITH A SMALL PRODUCTION IT IS POSSIBLE TO FULLY SATISFY THE NEED FOR MAINTENANCE AND REPAIR OF trucks. THE PROPOSED METHOD CAN BE USED IN DETERMINING THE OPTIMAL NOMENCLATURE AND THE NUMBER OF SPARE PARTS OF automobile transportation companies.