

## Project of a Modern Automobile Service Station Located Along the Road

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**Abstract:** *This article presents the design and planning of a modern automobile service station situated along a major roadway. The station is intended to provide comprehensive maintenance and repair services for various types of vehicles, ensuring convenience for drivers during long-distance travel. The project considers optimal location, functional zoning, and the integration of advanced diagnostic and repair equipment. Environmental standards, safety measures, and customer service facilities are also addressed to enhance efficiency and comfort. The goal is to create a service station that meets current automotive needs while being sustainable, accessible, and capable of handling high traffic volumes.*

**Keywords:** *Modern service station, roadside facility, vehicle maintenance, repair services, service efficiency, customer convenience.*

**Introduction.** The role and significance of transport in the socio-economic development of the state and raising the standard of living of the population are invaluable. Transport is one of the important branches of production. Its main task is to meet the country's demand for the transportation of various goods and passengers, ensure the division of labor between regions, and strengthen foreign economic relations [1,2]. Transport has a great influence on the distribution and development of productive forces throughout the country. Transport actively participates in the creation of various industrial and agricultural products and their delivery to consumers [3]. Transport plays a significant role in transporting passengers from one destination to another.

Development and modernization of road transport, engineering, communication and social infrastructure, ensuring the improvement of living conditions of the population: radical improvement of transport services for the population, increasing the safety of passenger transportation and reducing emissions of harmful substances into the environment, acquisition of new comfortable buses, construction and reconstruction of bus terminals and bus stations; Continuation of construction and reconstruction of road infrastructure, primarily the development of regional highways, major and current repairs of inter-farm rural highways, and streets of settlements [4].

The role of the road transport complex in the development of the country's economy is one of the sectors that form the infrastructure of the transport economy and serves as a necessary condition for production processes and a tool of labor as a means of transport in the distribution of material wealth. Although roads and moving means are the fruits of the labor process, they themselves participate in creating the product of labor. The accelerated development of the country's automotive industry and the revival of the "Great Silk Road" form the basis for the development of the republic's motor transport, which requires the creation of small and medium-sized car service enterprises based on modern technologies that meet the requirements of international standards for the organization and implementation of modern car service services to ensure a high level of technical condition of vehicles [5,6].

Improvement of the condition of highways and development of road transport infrastructure. The

consistent implementation of reforms aimed at modernizing the transport and communication network and increasing transit potential contributes to the integration of our country into international transport communications. In accordance with the Program for the Development and Modernization of Engineering, Communication, and Road Transport Infrastructure, the construction and repair of 520.1 km of roads were completed in 2016 by the Republican Road Fund.

### **Result and discussion.**

Project of a modern roadside vehicle maintenance station

During the year, 800 Onix cars will be serviced at city-type car maintenance stations.

NF "Onix" - 800

- average annual mileage of one vehicle in the region: "Onix" LY=30000 km;
- Number of cars sold during the year through the vehicle maintenance station: N<sub>sot</sub>=300 units;
- average number of vehicles entering the vehicle maintenance station during the year: d=5;
- labor intensity spent on servicing one vehicle (work\*hours/1000 km) "Onix" t=3. The production capacity of a vehicle maintenance station is determined by the number of vehicles that have undergone comprehensive maintenance in one year. The size of vehicle maintenance stations is calculated simultaneously with the number of car spaces allocated for vehicle maintenance, repair, waiting, and storage.

Currently, one indicator is adopted in our country for the indicators of the production capacity and volume of a vehicle maintenance station: a vehicle workstation for vehicle maintenance and routine repair work.

When determining the type and capacity of a city-based vehicle maintenance station, one of the main factors is the number and types of vehicles around the designed station.

To know the vehicle maintenance station, it is necessary to determine the approximate maintenance and current repair vehicle workstations. The annual labor intensity at maintenance and current repair posts is determined through the standard labor intensity per 1000 km of mileage.

$TT = NF * LY * t / 1000$  worker/hour;  $TT = 800 * 30000 * 3 / 1000 = 72000$  workers/hour

Including:

LY - average annual mileage of one vehicle, km;

NF - number of vehicles using the station during the year;

t - standard labor intensity per 1000 km of maintenance and current repairs, man-hours.

If the station provides for the sale of cars, warranty maintenance and repair, then the total volume of annual maintenance and repair work is calculated:

$T_{um} = T + T_{sot} + TKFTX + TKFR = 72000 + 1050 + 600 + 105 = 73755$ .  $T_{um} = 73755$

T<sub>sot</sub> - annual volume of pre-sale maintenance work, working hours; TKFR - annual volume of warranty repair work, working hours;

TKFTX - annual volume of warranty maintenance work, working hours.

$T_{sot} = N_{sot} * t_{sot} = 300 * 3.5 = 1050$

$TKFTX = N_{sot} * t_{KFTX} = 300 * 2.0 = 600$

$TKFR = NKFR * t_{KFR} = 30 * 3.5 = 105$

Nsot - the number of cars sold per year;

NKFR - the number of vehicles undergoing warranty repair; NKFR - (taken at a rate of 10-15% of the total cost)

$$NKFR = Nsot * 0.10\% = 100 * 0.10 = 30$$

tKFTX, tKFR - the volume of pre-sales, warranty, maintenance, and repair work per vehicle.

According to accepted rules and practice, tKFR and tKFTX are adopted at 3.5 working hours for passenger cars and 3.5 for subclass cars, and tKFTX at 2.0 working hours. The annual volume of washing and cleaning work is determined by the number of vehicles entering the station  $d=4$  times per year and the average volume of work  $Ty_u.y$ .

$$Ty_u.y = NF * d * ty_u.y = 800 * 5 * 0.5 = 2000$$

If the average volume of washing and cleaning work is mechanized,  $ty_u.y=0.2$ , if manual washing, 0.5 working hours is accepted.

The following table is filled in depending on the location of the calculated total annual volume of repair work. Division of maintenance and repair work in auto services into sections  $T_{um}=73755$

It is also necessary to calculate the volume of self-service of the enterprise. These works are calculated through the following auxiliary work volumes.

Maintenance and repair of the enterprise's technological equipment, engineering communications, maintenance and repair of all types of buildings, manufacturing and repair of tools and non-standard equipment.

The volume of auxiliary work is taken at a rate of 15-20% of the annual volume of maintenance and repair, washing and cleaning of the vehicle [8-12].

$$Ty_{ord} = (T_{um} + Ty_u.y) * Ky_{ord} / 100 = (T + Tsot + TKFTX + Ty_u.y) * Ky_{ord} / 100 =$$

$$= (73755 + 2000) * 18 / 100 = 13635.9, \text{ we accept } Ty_{ord} = 13636 \text{ working hours } Ky_{ord} - \text{percentage of auxiliary work, taken as 15-20\%.}$$

We accepted the cordon - 18%.

**Table 1. The volume of auxiliary work Ty is distributed approximately as follows:.**

№	Name of works	Workload	
		%	Working hours
1	Self-service	65	8862
2	Transportation	10	1364
3	Vehicle movement	5	682
4	Acceptance, storage, and distribution of material and technical materials	10	1364
5	Cleaning rooms and squares	10	1364
<b>Overall</b>		<b>100</b>	<b>13636</b>

## Conclusion.

This project aims to develop a state-of-the-art automobile service station located strategically along a major road or highway. The facility will provide a comprehensive range of automotive services, including mechanical repairs, diagnostics, fueling, tire services, car wash, and convenience retail. The primary objective is to cater to the growing demand for quick, reliable, and accessible vehicle services for both private and commercial drivers.

## Literatures

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