

Evaluation of the operating parameters of taxi cars in city of Rouse

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Abstract: - This report examines the requirements for taxi cars from the point of view of the tax regulator and the views of carriers and customers. An inquiry was conducted on the criteria that the customers of the taxi cars evaluate. A methodology for assessing the operating parameters of taxi-cars in Rouse has been introduced and it has evaluated the most frequently used taxi-cars.

Key-Words: - taxi cars, assessment, customers, taxi carrier, survey, operating parameters, normative basis

1 Introduction

In the European Union, more than 60% of the population lives in the cities. Cities have become a living environment for the majority of the population, so it is imperative that the standard of living in these areas is as high as possible. That is why the issue of urban mobility is particularly relevant. Taxi transport is an important part of the urban transport system in modern cities. Passenger taxi transport has a number of advantages over mass urban passenger transport between different areas of the city - no connection to a pre-established route network (ie the possibility of transporting freely chosen passenger routes), the ability to carry out transport Door-to-door, 24-hour, and more. It complements the mass urban passenger transport in the hours of peak loads when the car's capacity is exhausted, as well as at night when the passenger transport needs are reduced and the mass passenger transport interrupts its transport activity.

The taxi activity on the territory of the Republic of Bulgaria is regulated by the bodies of the Executive Agency "Automobile Administration" and the bodies of the Ministry of Interior. Ordinance 34 describes the terms and conditions for registering or deleting from the commercial register a person as a carrier offering a taxi service and its requirements, requirements for cars, requirements for drivers and taxi transportation of passengers [1,2,3,4,5].

2 Problem Formulation

Ordinance 34, section 4, also describes the requirements for the taxi vehicle:

have undergone a periodic roadworthiness test under the Road Traffic Act;

- Not equipped for learning purposes;
 - have at least 4 doors;
 - the controls must be located on the left
 - must be labeled with a "Taxi" sign that is illuminated at night and which is permanently fixed during working hours;
 - have an electronic fiscal cash register apparatus which is eligible according to Regulation 35;
 - must to have stickers with information about the name of the carrier, daily rate per kilometer in the city, night tariff per kilometer in the city, mileage outside of the settlement, price for stays, etc. Stickers must be glued to places visible to passengers;
 - must to be equipped with safety belts
 - must to be permanently painted in yellow
 - must to have a longitudinally aligned two-row ribbon along the entire length of the car with staggered squares.
- In case the taxi is hybrid, the requirement is to be permanently painted green. The front door of the vehicle must have the name and phone number of the carrier. The taxi-vehicle must also have a push button to switch on an electric bulb installed in the Taxi badge or be equipped with a radio signal and security signal transmitting system. The taximeter should have a watertight, waterproof hologram-proof sticker permanently glued to the front right mudguard and on the rear of the vehicle with information on the number of the permit issued by the respective municipality for that year [6,7].
- In taxi services, passengers seeking the service are mainly interested in:
- number of seats;
 - service tariff;

- luggage storage, etc.

Taxi cars can also be compared by criteria such as power, fuel consumption, additional ABS, travel comfort extras, and more.

The conditions for the taxi service may be determined by the taxi controller, but not directly by the user. When using a taxi service from a stand and directly from the road it is impossible to determine the quality parameters of the respective vehicle. This limits the ability to determine in advance the quality of the service. Therefore, it is necessary to identify different categories of cars according to their parameters in order to provide the possibility of pre-selection.

Taxi service users have their own vehicle requirements that are partly covered by those described in Ordinance 34. Compliance with these requirements by a taxi carrier would make it more attractive to prospective customers and more successful than competition.

3 Problem Solution

In order to establish the requirements of the users of the transport service to the taxi-cars in the town of Rousse, a survey was conducted for which the results are presented in Table 1.

Table 1

Results of a survey of user requirements for the taxi-vehicle

Requirement for the taxi	Share, %
Number of seats	57
Volume of luggage space	18
Size of seating	11
Competence of the driver	7
Comfort of the car	4
Possibility to transport a child in a specialized chair up to 3 years	2
Others	1

It is clear that the most important factor in choosing a taxi car is the number of seats. This implies the creation of a taxi fleet categorization in order to increase the user's participation in determining the parameters of the transport service.

In the Republic of Bulgaria there are no legally defined criteria for assessing taxi cars. Such a system exists in international bus transport, under the control of AEBTRI. The categorization created is based on several indicators:

- engine power / weight ratio;
- additional braking system
- heating independent of the engine;
- ventilation or air-conditioning system, etc.

The corresponding category is marked with stars that are placed on the right side of the bus where the passengers enter (fig.1) [8].



Fig. 1 International transport bus marked with a rating

A study has been carried out in the conditions of a taxi company working in the city of Rousse on the number of passengers who use the service in one carriage and the results are presented in Fig. 2. The total number of respondents is 499.

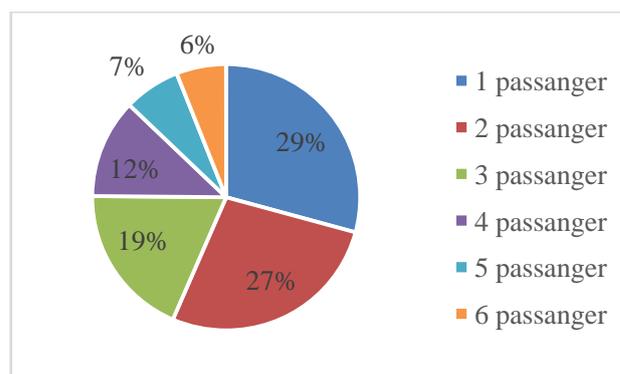


Fig. 2 Results of the survey of the number of passengers per carriage

The results confirm that most trips were made with one and two passengers respectively 29% and 27% of the respondents, and the most rarely the trip is made with more than four passengers.

The studies conducted on the requirements of the customers of the taxi services in the city of Rousse give reasons to identify four groups with requirements for taxi cars [9,10].

GROUP A:

1. Anti-lock braking system (ABS);
2. Ventilation or air conditioning system;
3. Sound installation;
4. In-car hand luggage space.
5. Minimum luggage compartment capacity up to 400 liters;
6. 6. Minimum number of passengers - 2;
7. 7. Ecological norm - EURO 4.

GROUP B:

1. Anti-lock braking system (ABS);

2. Ventilation or air conditioning system;
3. Sound installation;
4. In-car luggage space.
5. Non-engine heating with temperature control, also when the vehicle is stationary;
6. Lounges, blinds or side curtains;
7. Minimum luggage compartment capacity up to 600 liters;
8. Seat for children up to 3 years of age.
9. Minimum number of passengers - 3.
10. Environmental norm - EURO 5.
11. Driver - Traineeship over 3 years in the field of taxi transport.

GROUP C:

1. Anti-lock braking system (ABS);
2. Individually adjustable ventilation or air conditioning system;
3. Sound installation;
4. In-car luggage space.
5. Non-engine heating with temperature control, also when the vehicle is stationary;
6. Lounges, blinds or side curtains;
7. Minimum luggage compartment capacity up to 800 liters;
8. Seat for children under 3 years of age;
9. Place for newspapers and magazines;
10. Seat heating;
11. reading lamps for each passenger;
12. luggage compartment cover;
13. Minimum number of passengers - 4;
14. Ecological norm - EURO 6.
15. Driver - over 5 years of experience in the field of taxi services.

16. Taxi driver requirement for standard clothing.

GROUP D:

1. Anti-lock braking system (ABS);
2. Tilt adjustment of all seats (minimum angle 35 °);
3. Individually adjustable ventilation or air conditioning system;
4. Sound installation;
5. Inside cabin baggage space with a minimum height of 15 cm.
6. Non-engine heating with temperature control, also when the vehicle is stationary;
7. Shades, blinds or side curtains;
8. Minimum luggage compartment capacity up to 1000 l;
9. Seat for children up to 3 years of age;
10. Place for newspapers and magazines;
11. Seat heating;
12. reading lamps for each passenger;
13. luggage compartment cover;
14. Moisture Removal Device:
15. coloured glass;
16. Refrigerator;
17. Minimum number of passengers - 5;
18. Ecological norm - EURO 6.
19. Driver - over 10 years experience in the field of taxi transport.
20. Taxi driver requirement for standard clothing.
21. The taxi driver should have a foreign language - English, German or Russian.

The technical characteristics of the most popular vehicles used for taxi transfers are shown in Table 2.

Table 2
Technical characteristics of the most used cars for taxi activity 2019

Manufacture of vehicle	Dacia Logan II	Dacia Sandero	Dacia Logan combi	Skoda Fabia II	Reno Megane Symbol Clio	Toyota Prius (hibrid)
Engine (modification)	1.2 16v	1.5 dCi	1.6i	1.9 TDI	1.6i 16V	1.8 VVT-I
Year of manufacture	2014	2008	2004	2007	2002	2012
Engine power	90 h.p.	90 h.p.	87 h.p.	105 h.p.	107 h.p.	99 h.p.
Number of seats	5	5	5	5	5	5
Fuel consumption (city)	5,0 l/100 km.	5,0 l/100 km.	10 l/100 km.	6,4 l/100 km.	9,9 l/100 km.	3,9 l/100 km.
Fuel consumption (highway)	3,8 l/100 km.	3,7 l/100 km.	5,8 l/100 km.	4,1 l/100 km.	5,6 l/100 km.	3,7 l/100 km.
Fuel consumption (combine)	3,8 l/100 km.	4,1 l/100 km.	8,0 l/100 km.	4,9 l/100 km.	7,2 l/100 km.	3,9 l/100 km.
Ecological standard	Euro 5	Euro 5	Euro 4	Euro 4	Euro 4	Euro 5 F
Load capacity	475 kg.	499 kg.	800 kg.	515 kg.	550 kg.	415 kg.

When analyzing the technical characteristics of the above-described cars, it is clear that the load capacity for the various vehicles varies from 415 to

800 kg. Their passenger capacity is 5 passengers. It is important to note that the criteria for choosing a taxi service are:

- least cost;
- Efficient spare parts;
- Low price;
- profitable leasing conditions;
- Age of the car.

These criteria for choosing a taxi car do not match, fully with the criteria of the customers [11,12].

According to the assessment methodology described, the available taxi cars fall in the assessment GROUP C, which leads to the conclusion that in order to improve the quality of the taxi service it is necessary to replace the taxi cars with the ones from the highest category (GROUP D).

As a result of the research it was found that the most suitable vehicle meets the criteria for assessment of customer, carrier and normative basis for taxi transportation in the conditions of Rouse is Dacia Logan (figure 3).



Fig. 3 Dacia Logan

4 Conclusion

The regulatory framework governing the requirements for cars used for taxi cars contains a sufficient number of unambiguous criteria.

The three most important criteria for customers are the number of seats (57%), the luggage compartment volume (18%) and the seating capacity (11%).

In the Republic of Bulgaria there are no legally defined criteria for assessing taxi cars.

Most trips were made with one and two passengers, respectively 29% and 27% of the respondents, and the most rarely the trip is made with more than four passengers.

According to the assessment methodology described, the available taxi cars fall into the assessment group B, which leads to the conclusion that in order to improve the quality of the taxi service it is necessary to replace the taxi cars with the ones from the highest category (category E).

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