



Section: Roads and Railways

## Roadside Infrastructure and Rest Areas Concepts in Lithuania

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### Abstract

Safety rest areas (RAs) provide travellers and drivers safe and convenient facilities to rest themselves before continuing with their journey. The establishment of rest areas on major roads may help to decrease number of accidents caused by drivers' fatigue, to ensure parking place for short breaks and long-term stop of cargo vehicles, to reduce the excess travel time and, of course, to improve the overall travel comfort. Well designed and customers friendly rest areas with improved secure parking opportunities is a necessity in all countries. This article analyzes types of roadside rest areas, rest area arrangement and recreation facilities infrastructure on Lithuanian roads. These basic rest area services must be open and available to all users. The recommended rest areas are socioeconomically feasible and environmentally friendly and safe.

**Keywords:** infrastructure; rest area; travel comfort; parking; recreation facilities.

### 1. Introduction

For the sake of safe and easy travelling, the road users, i.e. drivers and passengers, need to be provided with adequately arranged service infrastructure objects and road engineering facilities. Higher category of road necessitates more complex structures and facilities, and more versatile nomenclature. Intensive traffic motorways are ridden by public means of transport, thus the roadsides are adequately equipped with bus stops, rest areas, public sightseeing areas, filling stations and visual information stands.

Rest areas worldwide are considered as a place for drivers to stop for fuel refill or to rest and have a snack. Fast food outlets, restaurants, small catering outlets and even motels are available at most filling stations. The key target of rest areas is pointed to the security of the area users and the rest area convenience and functionality. The locations chosen for rest areas are usually found in picturesque places with good microclimate available.

Rest area (RA) proximity and quality depends upon a country. RA along international tourism motorways constitute vast complexes including cafes, restaurants, motels or small hotels with spaces allocated for open air leisure entertainments. Furthermore, such complexes are equipped with vehicle maintenance and repair services, a filling station and a store.

In some countries like Spain rest areas are uncommon – motorists are directed to establishments that serve both the travelling public and the local population while in other countries access to a rest area is impossible other than from a motorway. The Dutch rest area [1] is typical of many European rest areas in that it has no access roads other than from the motorway itself. The term “rest area” is not generally used in the United Kingdom. The most common terms are motorway service areas, motorway service stations or simply motorway services. As with the rest of the world, these are places where drivers can leave a motorway to refuel, rest, or take refreshments. Most service stations accommodate fast food outlets, restaurants, small food outlets and coffee shops. In Finland rest areas are constructed and maintained by the national government, but the local municipality provides local maps and sanitary services. In the case of commercial services, the shop has the responsibility for cleanliness of the area. Rest areas are designed mostly for long-distance voyagers (a rest area each 20 km), in France is one such area every 20 km on auto routes too. Raststätte is the name of the service areas on the German and Austrian Autobahn. It includes a gas station, public phones, restaurants, restrooms, parking and, most often, a hotel or a motel. If the service area is off the highway, it is named Rasthof or Autohof.

The theory of location studies which is the best location for certain specific service centres in order to achieve certain specific objectives. There is a great variety of situations on which location problems are considered from different angles [2].

Appropriate positioning of rest areas and vehicle maintenance services meet the cultural, public and technical needs of travellers. Furthermore, they serve as an important factor for environment preservation. Adverse impact on the landscape, vegetation and fauna, an even on the traffic safety is made along the motorways with traveller service complexes missing or with those arranged in a spontaneous manner.

## 2. Principles for the Roadside Rest Area Arrangement

Arrangement, dimensioning, nomenclature and nature of rest areas depend on numerous factors, viz.:

- Traffic intensity and composition;
- Specifics of the territory intersected by a motorway;
- Average driving speed projected for that particular motorway;
- Attractiveness of the rest area and character of the attributed function;
- Specifics of the landscape the motorway passes and the like.

Design of rest areas need to define a rational average distance/interval between the rest areas, with subsequent projection of a number of car parking lots. Distances between traffic service facilities are determined in respect of the necessary rest breaks for car drivers. Traffic service complexes must contain three typical planning zones:

- Zone one – car/vehicle parking zone with an access and exit road;
- Zone two – passenger rest zone with a shed, tables and benches and, in the event of larger service complexes, with a hotel/motel, restaurant, cafe, store, etc.;
- Zone three – sanitary and hygiene zone with WC and waste receptacle.

Larger traffic service complexes must contain vehicle maintenance zone with a filling station and car repair services while in smaller complexes the said facilities are replaced with car inspection/maintenance lots.

## 3. Planning and Establishment of Rest Areas in Lithuania

Following an order placed by the Lithuanian Road Administration, a Programme for the development of state sector road infrastructure objects was elaborated by Transport and road research institute in 2004. Analysis of rest areas has been performed as a part of the programme elaboration and the following has been identified:

- As per the related legislation in force, density of the rest area arrangement along Lithuanian motorways is sufficient however, it is far too excessive according to the international experience;
- Technical state (pavement, facilities) and sanitary conditions of the rest areas are poor and their upkeep is insufficient;
- No differentiation of rest areas in terms of their function is performed (those intended for rest, services or mixed type);
- No exact site borders are available for the majority of rest areas.

A Plan of the measures for implementation of rest and car parking areas development programme for the period of 2008–2017 [3] was elaborated by Transport and road research institute, SE to tackle the abovementioned problems. Figure 1 illustrates a preliminary prospective arrangement of rest and parking areas in 2017 observing the said Plan of the measures for implementation of rest and car parking areas development programme.



Fig. 1. A preliminary prospective arrangement of rest and parking areas in 2017 [3]

According to the information system of the Lithuanian motorways as of 31 January 2006, 384 rest areas were available at the national significance motorways in Lithuania. 71 rest areas are not included into the Plan of the measures for implementation of rest and car parking areas development programme due to the planned removal of these. Before the launch of the programme at the beginning of 2008, removal/elimination of 15 rest areas at the main and country roads took place within the period of 2006 to 2007. In 2017 the anticipated number of rest and car parking areas at the main and country roads would be 235, i.e. approximately 61% of the entire number of previously established rest areas or 75% of currently operated rest areas at the main and country roads will remain.

The following properties are inherent of the most rest areas: hard cover (95%), non-urbanized surroundings (87%), motorway proximity (81%); pleasant aesthetic view (79%), rest areas in a forest or at a group of trees (76%), acceptable pavement quality (74%). Properties the most lacked by the rest areas are as listed further (the acutest are started with and a share of areas having the property in question is indicated in brackets): free of charge, with water supply and WCs installed (2%), with lighting installed (17%), functional variety (when it is possible to use both, services proposed by a catering outlet and the available outdoor furniture) (22%), separate lots for parking of cars and heavy duty vehicles (22 %), deceleration and acceleration lanes (22%). (*Plan of the measures for implementation of rest and car parking areas development programme. Transport and road research institute. 2007*).

Below is presented classification of rest areas according to the ***Plan of the measures for implementation of rest and car parking areas development programme*** [3]:

- Grade I rest areas intended for servicing of the national freight and passenger transport are located at the main motorways of the state (60–80 km distance between the rest areas);
- Grade II rest areas intended for those travelling by cars are located at the main and country motorways and may also be positioned near observation/sightseeing places (arrangement at 20 – 40 km intervals);
- Grade III rest areas intended for short stops of those travelling by cars are located at the main and country motorways (arrangement at 20 – 40 km intervals).

Presently the rest areas at Lithuanian motorways fail to conform to the European standards. Moreover, user needs are hardly met.

It is a practice of many countries to have rest and parking areas in the attractive natural surroundings: at a water body, in a forest, in a place opening up to a picturesque landscape. Attraction of visitors to such places and a wish to stop and spend some time there even with no developed infrastructure present has been observed.



Fig. 2. Rest area at A14 Vilnius – Utena motorway

Overall justification of location of a rest complex is required prior to determination of the arrangement of service and rest complexes at the national significance motorways.

According to the valid national standards, density of rest areas along Lithuanian motorways is sufficient though it is far too excessive from the international experience viewpoint. Technical state (pavement, facilities) and sanitary conditions as well as upkeep of the rest areas are insufficient (Fig. 2). No differentiation of rest areas in terms of their function is performed (those intended for rest, services or mixed type). Furthermore, no exact site borders are available for the majority of rest areas.

No official document to enforce the establishment of rest areas is present and Technical Regulation on Motorways is relied on instead: *KTR 1.01:2008, Motorways* [4]. It is very important to have the developed guidelines for the establishment of rest areas on motorways. The guidelines in question would stipulate the requirements pertaining to planning, design, installation and upkeep/maintenance of the rest areas at the national significance motorways.

#### 4. Rest Area Planning

Prime consideration to the user needs must be given in the rest area planning process. There are three main categories of road users: truck drivers, tourists and general road users. Each of these categories have different motivation for stopping [6].

- Truck drivers must stop for a defined period in accordance to law. These stops are regulated by Regulation (EC) No 561/2006 and comprise 15–45 minutes for a short-break and 9–11 hours for a long break.

- Tourist travellers being a very diverse group of users have a choice when to stop. This category often utilizes opportunities provided by commercial facilities (petrol station, road side shops, restaurants) but also require an equipped place for food and beverage breaks, sanitary needs, fatigue management. This importance of rest area in remote and little populated rural areas is critical because of lack of commercial roadside facilities.
- General road users include residents of towns and villages travelling for work, shopping or personal matters. They are likely to make their journey as short as possible but therefore may need to stop to manage fatigue. This group of users values the cleanness, safety and aesthetics of the rest area as the most critical factor when they choose to stop.

All main rest areas must be accessible 24/7 for all user categories, including the handicapped. The RAs must be equipped with sanitary appliances (WC, water supply), outdoor facilities (benches and tables, leisure zones), lighting when it becomes dark and surveillance cameras (for personal security reasons).

The RA planning targets encompassing the stages from demand to implementation must meet general planning targets of the national significance motorways and the needs of road users.

Planning of the RA has to take into account the requirements set for traffic safety, traffic organization, environmental protection and cost-efficiency. Furthermore, adequate rest of road users and satisfaction of their needs must also be given an appropriate consideration.

The below has to be ensured for the RA planning:

- The demand of vehicle parking lots and availability of sanitary facilities and services proposed;
- Top quality stops, rest and safety of road users;
- Safe access of road users to RA after a long drive at a high speed;
- Unimpeded, easy and safe parking of cars and pedestrian traffic/movement;
- The least possible adverse impact on nature and landscape;
- Investment, operation and maintenance costs.

Planning of an area for rest and parking must assess a number of visitors and vehicles intended to be present there at a time and a type of vehicles and a category of visitors to be there most often. Besides, distances to other RA, the existing infrastructure and the surrounding landscape also has to be considered.

Grouping of RAs into two types is possible: RAs with the supply of services inclusive and RAs with the supply of services exclusive.

A rest area with the supply of services means the RA with vehicle maintenance and road user servicing objects/facilities while a rest area without supply of services would mean the place with or without a WC building.

The following are attributed to the RA traffic infrastructure: connection to the main motorway (one or different level carriageway); access and exist road, the RA connecting road; traffic lanes between the parking lots available at the RA parking lots or without them; the RA parking lots (parking flaps and lanes); curbs; paved or unpaved dividing zones (sidelong dividers at the carriageway of the main road, dividers between the parking lot rows, dividing isles, dividing isles between the car parking rows); rest/leisure zones and landscape parcels (free parcels) integrated into the RA.

Service supply facilities/structures connected to the RA may be supplemented with other facilities, e. g. police, customs or border control posts, car repair shops (under a condition that their maintenance costs are borne by the services or entities concerned).

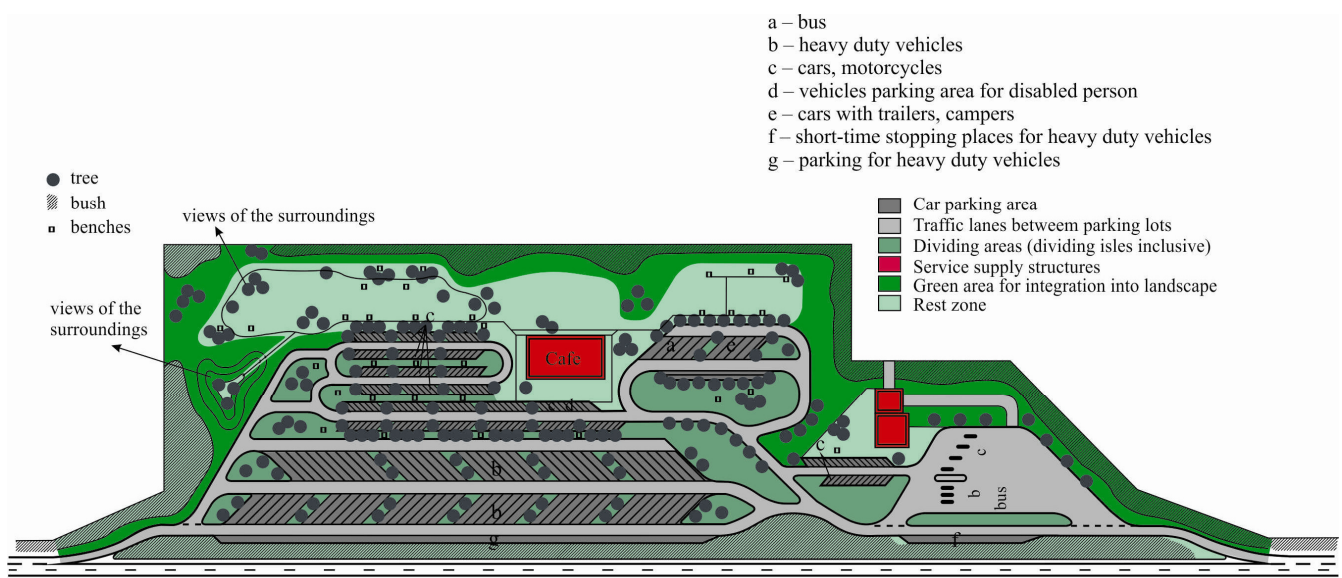


Fig. 3. An example of a rest area with supply of services



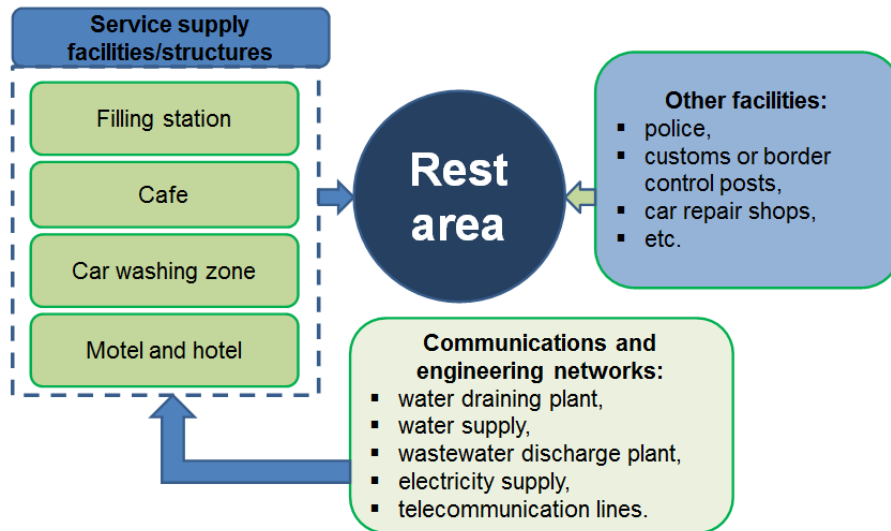


Fig. 4. Rest area service supply facilities/structures

Distances between RAs on motorways and highways can be determined on the basis of roads user needs and traffic safety.

Petkevičius with other authors [7] analysed West European and Russian experience and based on those analysis recommend to classify the objects and complexes of roadside service and infrastructure into categories A, B, C, D, E, F, and G depending on the rest time and to arrange them according to his model. Having evaluated the questionnaire data and actual distribution of service complexes by the Lithuanian main roads, the authors recommend to space the service objects and complexes at suggested rational distances.

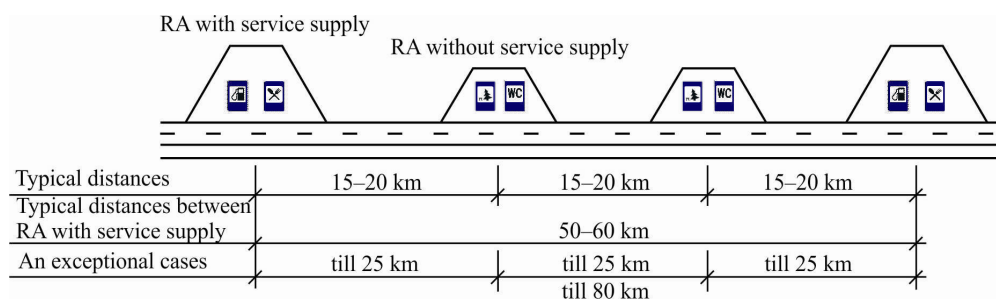


Fig. 5. Distances between the arranged rest areas

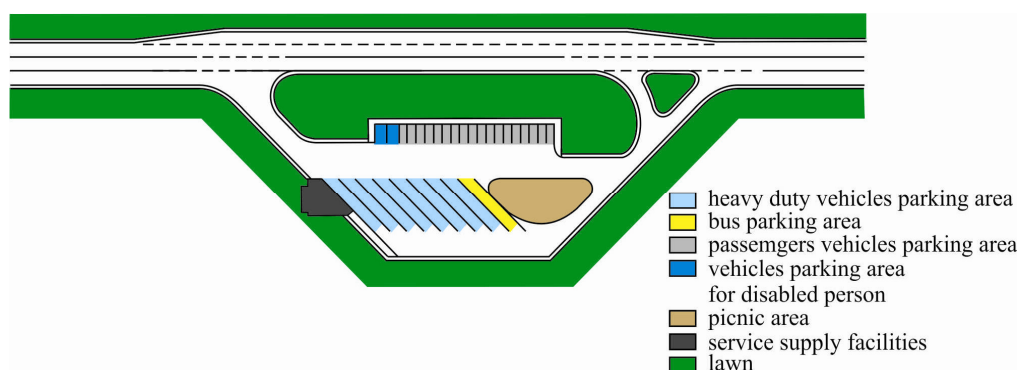


Fig. 6. An example of a rest area division into function zones

Newly constructed rest areas with the supply of services inclusive according the experience of European countries [5], should be arranged at 50–60 km distances and up to 80 km in exceptional cases (in case of low long-distance traffic intensity or seasonal increase in traffic intensity). Among the RAs with the supply of services inclusive, the RAs without supply of services are positioned each 15–20 km or 25 km distance may be applied in exceptional cases (in case of low long-distance traffic intensity or seasonal increase in traffic intensity).

In the event of significantly larger distance than that required between the exiting RAs without supply of services, reconstruction of the RAs without supply of services in a respective highway section would be expedient.

For rest area construction it is suggested, that the area is divided into function zones to separate traffic of different vehicles on the site and to ensure safety of users. Parking lots for the handicapped must be available with the shortest possible access to the service supply facilities.

## 5. Significance of Rest Areas

The RAs arranged along the motorways provide travellers with an advantageous opportunity for their safety and comfortable rest. Besides, they contribute to the reduced number of accidents arising from drivers' fatigue. The presence of RAs improves an overall comfort of a trip, helps to collect income from tourists and contributes to the reduced roadside littering as a result random vehicle stops.

Well designed centres providing favourable conditions for travellers and suggesting improved safety parking conditions are absolutely necessary in all EU member states for the below reasons[6]:

- Reduced freight thefts due to a vehicle parked in a safe place;
- Improved driver and passenger security and comfort;
- Safeguarded economic growth of the region due to the proposed supply of added value services;
- Stimulation of travellers to use services of the local businesses;
- Support and promotion of tourism and assistance to local communities in providing them with marketing and advertising opportunities;
- Safe RAs help to ensure a free movement of goods and individuals, which is one of the principles of the European integration process.

## 6. Conclusions and Recommendations

1. Design of new RAs has to take into account the landscape, topography, vegetation, etc. Views opening up to a picturesque landscape need preservation.

2. Any RA must be functional, with its traffic infrastructure adjusted to different means of transport.

3. Two types of rest areas must be distinguished: a rest area with supply of services and a rest area without supply of services. It is recommended that they are established minding the typical distances of rest areas arrangement along motorways.

4. The established RA must ensure safe and uncomplicated traffic organization inside it. An adequate and legible marking of rest areas is of special importance: positioning of direction indicators, traffic control signs, carriageway marking.

5. In the rest area construction its division into the following function zones is recommended: a zone for car parking lots, a zone for heavy duty vehicle parking lots, holidaymakers' zone, service facilities zone and green plantation zone.

6. Rest areas at regional and local roads are established only upon justification of their necessity.

7. Special areas intended for servicing of transit freight and passenger vehicles can be arranged at nodes (junctions) of international significance highways or main motorways.

8. Rest areas should be arranged after careful assessment of distances from higher grade rest areas and considering the positioning of places of interest.

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