1 Introduction
The expected growth in cooperation between the European Union and the countries of Central and East Europe has stressed the strategy of importance of transport in mutual relations. The free movement of the people and exchange of goods are two main signs for the positive synergetic future development of mutual cooperation in this region. The development of the transport network and infrastructure in Slovakia is oriented to construction and modernisation of the whole transport network and infrastructure to create connection with neighbouring countries and to be close to future economic cooperation with the European Union as well as with the other parts of Central and East Europe.

2 Basic Data
The Slovak Republic is divided into 8 counties and 79 districts. Slovakia covers an area of 49,036 km², and had a population of 5.4 million inhabitants. The capital city is Bratislava with 453 thousand inhabitants. The settlement structure of Slovakia is characterised by high degree of urbanisation of the country. At present more than 56% of the total population of this country live in cities with more than 5000 inhabitants. The present motorization grade in Slovakia is 213 cars per 1000 inhabitants.

3 Motorways on the Multimodal corridors in Slovakia
A dramatic increase in
motorization as a result of the opening of borders in 1989 signalled the need for more intensive construction of road and motorway networks. The strategy of further construction development of motorways in total length of about 820 km was decided by the Government of the Slovak Republic in its decisions issued in 1995 and in 1998. The main objective of the motorway program is to satisfy the current and anticipated requirements set on the Slovak transportation market at high functionality level. Further more, after the completion of the motorway program, Slovakia shall become a functional part of the main Pan-European transport corridors. At present, there are four multimodal transport corridors crossing Slovakia territory (Fig. 1):

- Corridor IV - WestEast Rail/Road connection as the middle part of the corridor Berlin/ Nurnberg-Praha-Bratislava-Budapest-Istanbul;
- Corridor V.A - Bratislava – Zilina – Kosice – Ukraine as part of the corridor V., which consist of Rail/ Road/ Waterways/Airports/Combined Transport Terminals;
- Corridor VI - Poland – Zwardon/Skalite – Zilina, as the southern arm of the corridor Gdansk – Katovice consist of Rail/ Road connection to the corridor UA in Zilina;
- Corridor VII – the waterway Danube as a part of the Trans-European Water Magistrale Rhine – Main – Danube with the connection to the Rail/ Road/ Airports terminals.

These transport multimodal corridors follow the main transport routes (road, rail and waterway) of the transport network within Slovakia. This corridors are supported by planned, and already constructed transport infrastructure equipment with combined transport terminals, international airports and inland waterway ports.

The motorway system master plan which was approved by the Slovak Government represents a comprehensive streamlined construction works consisting of the particular motorways routes. Currently, the length of the motorways in operation in Slovakia attains 290 km. The individual existing and planned motorway routes are following (Fig. 2):

- the motorway route D1 leading from the state border with Czech Republic in the area of Trenčín, to the east state border with Ukraine in the area of Vysne Nemecke. The total length of this route is 391 km;
- the motorway route D2 also leads from the state border with Czech Republic, from Kuty through Bratislava and down to the south border with Hungary. The total length of this motorway route is 80 km;
- the motorway route D18 leads from the town of Zilina up to the north border with Poland in the area of Cadca. The total length of this route is 61 km;
- the motorway route D61 leads from the border with Austria through Bratislava up to the town of Trenčín. The total length is 128 km;

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Fig. 3: Motorways and four-lane roads
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*Intensity 1500 veh. / 24 h

### Fig. 4: Two-lane roads

- the motorway route D65 will lead from Trnava through Ziar nad Hronom to Banska Bystrica. The total length of this stretch will be 160 km.

Summarising all the above-mentioned routes the overall length of the motorway situated on the territory of the Slovak Republic will be 820 km.

### 4 Road and Motorway Parameters

The road and motorway category width depends on the traffic volumes. The motorways and four-lane roads are built in the category width of 26.5m, with 2x2 lanes (Fig. 3) and the other national roads are built as a two-lane roads (Fig. 4). At present there are some motorways stretches in operation, that are constructed in a half profile.

Typical pavement structure data of motorway are following:
- surfacing: 100 mm asphalt concret + 100 mm asphalt roadbase
- base: 200 mm cement stabilisation 200 mm drainage layer
- total thickness of 580 (to) 620 mm.

### 5 Maximal Tunnel and Bridge High Clearance

There were elaborated several studies on the high costs of the road tunnels in Slovakia. Concerning this the Ministry of Transport Posts and Telecommunication has given an exception of cross-junction of motorway tunnel. According this exception, the horizontal one way tunnel pavement width is 7,5 m (2x3,5m + 2x0,25m) and 4,5m as the minimal ground clearance about the pavement. The normal ground clearance of the motorway or 1st class road on the free route is 4,8 m high and on the routes with over dimensioned load vehicles the high clearance have to be at least 5,2 m high.

### 6 Present and Forecast Traffic Volume

Road traffic volume in the whole territory of Slovakia has been regularly observed in national traffic censuses since 1958, since 1980 in five-year intervals and since 1990 with automatic traffic census on the 1st and 2nd class roads. Since 1992 on motorways in there are approximately 70 checkpoints. Analysis and data processing on the traffic census data are fully compatible with the similar procedures of the EU countries. The development of the traffic volume within the last ten years were marked with an extensive growth of the number of cars. Since 1990 the traffic volume has generally increased. The highest growth has been achieved on motorways.

For the transport development forecast, the social-economic calculation has been performed, which are important with respect to traffic generation. These are mainly the social economic indicators like e.g. population census, level of GDP, mobility and motorization grade, etc. The Slovak Road Administration uses the analytical and forecast model EMME 2. At present the new scheme of the further motorway construction in Slovakia is being prepared.

### 7 Motorways Construction Time Schedule

An intensive work on development of the motorway network has commenced in the 1st half of 1996 with the total increment of newly constructed motorway reaching 93 km by the end of 1998. During this period the motorway construction works development rate has attained approx. 30 km of new motorway per 1 year of work. At present, the project's time
schedule for 1999-2002, i.e. for the next 4 years, is being adjusted according to the available funding possibilities. The medium term objective pursued by this project is to finish all incomplete motorway stretches and motorway connectors currently by the end of 2002, and to start new motorway construction projects on the territory of the capital Bratislava.

8 Project’s Financing Scheme

According to the Slovak law, the State Road Administration Fund (SFCH) has been established, with the aim to procure funds for development of roads and motorways. The SFCH fund is entitled to procure also the loans from commercial banks. The financing scheme for motorway construction project is based on the principle of acquiring the borrowed and extra budgetary funds for the SFCH and then repaying these borrowed and extra budgetary funds from the state budget and/or directly by SFCH. The repayment of these bank loans is guaranteed by the state. The calculated total cost for the medium term construction works until 2002 attains 32,725 billion Sk (889.2 million USD).

Regarding to the public procurement procedure the planned motorway network has been divided into the motorway stretches 10 to 20 km long. For each particular motorway stretch a separate project documentation shall be elaborated. The public tender is launched for each motorway stretch separately. The tendering procedure is governed by the public Procurement Act and it is open also for foreign tenderers. All planned motorway stretches are subject to legal assessment performed in a procedure according to the Act on Environmental Assessment of Construction Works and a separate study has been elaborated for each planned motorway stretch. The economic effectiveness of the project is evaluated by means of the cost-profit calculation. On the cost side, one takes into account the costs of construction works, including the maintenance cost during operation and compares it, on the profit side, with the operating cost of vehicles, the saving of travel time and the costs incurred through traffic accidents.

9 Pavement Management and Maintenance Operation

Pavements of motorways and roads are the most important part of the road network, because their operational capacity (surface quality, smoothness and roughness) and operational efficiency are the major quality criteria of the road network. There are three basic technological criteria according to the pavement damages and the technological possibilities of their repair:

1. routine maintenance (local pavement repairs);
2. continuous maintenance (covering with thin layers up to 3 cm, coating, sparing, etc.);
3. pavement reconstruction (pavement repairing with levelling of unevenness covering with layers approximately 3 cm).

The pavement diagnostics is performed and the tasks of pavement management are solved in the Road Data Bank (RDB). It is the system for objective and effective reconstruction and maintenance planning of the Slovak road network. The priority model uses the road network data, the results of pavement diagnostics as well as the data obtained from the road administrators, is operated for a yearly order assignment of the sections to have the pavement reconstructed.

According to the data of the “Road Data Bank” for 1998, the costs for the routine and continuous maintenance and reconstruction of the road network were about 3 205,2 million SK. The Slovak Road Administration manages the road motorway network through its executive management units:

- Management Maintenance (MM): 36 MMs
- Motorway Maintenance Centres (MMC): 6 MMs

After completing of the motorway network, the number of MMs will increase to 13.

10 Accidents and Traffic Safety

Traffic accidents on the Slovak road network are a serious social problem and they belong to the criteria in the development of the road network. In Slovakia, in 1997 from the total number of 64 997 traffic accidents 42.52% happened on the rural roads and motorways. The great deal of the accidents happened on the roads in the urban areas, mostly on 1st class roads and through roads, where the speed limit in urban areas is often exceeded.

According to the traffic safety measures there was in the period of 1993-97 in Slovakia implemented 50 kmph speed limit in urban areas. But in the 1997 the Parliament has again risen the speed limit in the urban areas to 60kmph. There are no special traffic safety measures in the last period in Slovakia.

11 Conclusions

The constructed and planned multimodal corridors, where the motorway and main road create the most important modern transport network, is very important for further Slovak development and communication with European Union and neighbouring countries and will permit its incorporation into European market and integration processes.

REFERENCES

MOTORWAY CONSTRUCTION ON TERRITORY OF SLOVAK REPUBLIC (1999)-Information of the Ministry of Transport, Posts and Telecommunication of the SR, Bratislava.

