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SLOVAK ROAD TRANSPORT FROM THE POINT OF VIEW OF SUSTAINABLE DEVELOPMENT

In spite of the various facts transport belongs to the main contaminers of environment, therefore another transport development is contingent on conditions of permanently sustained development.

The article deals with transport negative effects to the environment at present and about expected trends in the near future.

Introduction

The term “sustainable development” was implemented globally in the report by the World Environmental and Development named “Our Common Future” that was discussed by the UN General Assembly in 1987 (The Commission chaired by Harlem Brundtland – the Norwegian Prime Minister – was established by a resolution of the UN General Assembly in 1983). Under this report, sustainable development refers to such developmental methods that satisfy the present needs without harming possibilities of future generations to satisfy their own needs.

Road Transport and Sustainable Development

Transport is considered to be one of the factors significantly affecting economic development. It ensures transports of raw materials, energy resources and energy itself, goods, products and services, as well as of persons and information. From the economic aspect, it is a factor limiting economy. This is evidenced also by a fact seen in Slovakia when the transport branch contributed to GDP with 7.7 % in 2003. Road transport is domineering among various types of transport and its share expressed in tkm increased from 27.51% to 37.37% in the period from 1996 to 2003. On the other hand, transport is a source of enormous atmospheric emissions; therefore it is necessary to consider a revision of the present transport systems in the light of creating a better model and streamlining transport and transportation system management. The fundamental goal of this agenda should be the development and implementation of economically effective strategies and programmes

that allow for a decrease of harmful emissions emitted by means of transport to air, as well as abatement of other harmful impacts of transport on the environment while following developmental priorities, specific local and national conditions and safety considerations.

The increase in the volume of road cargo transport supported by insufficient competition on part of railways in terms of cargo transport, and the increase in individual motorization to the detriment of mass public transport brings about the increase in fuel consumption in the field of transport, what gives a way to tendencies resulting in higher demands on the environment, including impacts on residential zones by noise and emissions of pollutants. The present period can be characterised as a turn to environmentally less friendly means of transport.

Road transport and its impacts on the environment mean not only vehicles, noise and emissions of pollutants. Let’s look at the effects of road transport on sustainable development in Slovakia in broader terms.

Transport Infrastructure

It consists of roads with national importance (class I, II, III) and highways, including their sections in cities and municipalities included into the road network, and buildings required for road transport operation. The Slovak road network comprised 17, 772 km of roads and highways in 2003, of which highways equalled to 313 km. Considering the relief of the terrain, the density of the

Basic Information on Transport Infrastructure

Table 1

| Indicator | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Length of roads and highways | 17 865 | 17 889 | 17 869 | 17 867 | 17 627 | 17 710 | 17 734 | 17 737 | 17 736 | 17 750 | 17 772 |
| of which highways | 198 | 198 | 198 | 215 | 219 | 228 | 295 | 296 | 296 | 302 | 313 |

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Slovak road networks is seen as sufficient and comparable with the average in Europe. There are 3.18 km of roads per 1,000 inhabitants. The development of lengths of roads and highways over the period of 1993-2003 is seen in Table 1.

Machinery

The number of vehicles used in road transport keeps increasing. Passenger cars contribute the most to this increase. In spite of this fact, the development in the number of road vehicles used on our roads has had some positive changes, too. They include:

- Increase in the number of vehicles equipped with a catalyst, high energetic efficiency and low production of pollutants in exhaust gases,
- Decrease in the number of passenger motor vehicles with a two-stroke engine,
- Significant improvement in technical condition of vehicles in every category.

These are reasons why the increase in the number of passenger cars in Slovakia is not reflected in higher emissions of pollutants, because it is the increase in ecologically more efficient vehicles rather than vehicles of obsolete generations. The issue of renewal of used up machinery in mass public transport remains to be a problem, as its machinery is depreciated up to 80 % and even its simple renewal is not possible due to scarcity of financial resources.

The development in the number of vehicles used in road transport is shown in Table 2.

Transport Outputs in Passenger and Cargo Road Transport

Development of passenger transportation by means of public mass road transport shows a long-term decrease in the number of transported passengers as well as in the number of total outputs (table 3). This is due to major changes in the division of transportation performances, in which individual passenger transport gets established to the detriment of any other types of mass transport.

The development in transportation outputs in cargo road transport over the period of 1993 - 2003 can be characterised as an increasing-decreasing tendency. Since 1995, it takes over the dominant position on the Slovak market from railway transport and it continues to keep this position.

Fuel and Energy Consumption

The raising tendency in fuel and energy consumption per one thousand of persons transported by road transport is affected by the increasing share of individual car transport and decreasing

Number of Vehicles in Road Transport (pieces)

Table 2

| Number of vehicles | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Passenger | 994 933 | 994 046 | 1 015 794 | 1 058 425 | 1 135 914 | 1 196 109 | 1 236 396 | 1 274 244 | 1 292 843 | 1 326 891 | 1 356 185 |
| Trucks and pick-ups | 101 552 | 102 470 | 102 634 | 97 078 | 103 080 | 111 081 | 115 981 | 110 714 | 120 399 | 130 334 | 142 140 |
| Special utility | 46 121 | 45 484 | 45 797 | 45 430 | 45 376 | 43 690 | 41 670 | 39 188 | 36 082 | 34 150 | 32 033 |
| Tractors | — | — | — | — | 600 | 1 721 | 2 306 | 3 281 | 4 994 | 6 837 | 8 851 |
| Buses | 12 655 | 12 066 | 11 812 | 11 321 | 11 235 | 11 293 | 11 101 | 10 920 | 10 649 | 10 589 | 10 568 |
| Agricultural vehicles | 65 150 | 64 729 | 64 536 | 62 810 | 63 145 | 63 448 | 63 493 | 64 351 | 63 422 | 62 644 | 61 690 |
| Motorcycles | 81 263 | 80 473 | 81 847 | 79 479 | 81 062 | 100 891 | 44 215 | 45 647 | 46 676 | 47 900 | 48 709 |
| Trailers and semi-trailers | 167 174 | 171 125 | 175 740 | 176 246 | 182 893 | 191 241 | 197 917 | 201 269 | 206 627 | 213 167 | 218 517 |
| Others | — | — | — | — | — | — | — | 2 226 | 1 507 | 1 306 | 1 161 |
| Total | 1 468 848 | 1 470 393 | 1 498 160 | 1 530 789 | 1 623 305 | 1 719 474 | 1 713 079 | 1 751 840 | 1 783 199 | 1 833 818 | 1 879 854 |

Developments in Passenger Transportation and Goods Transportation in Road Transport

Table 3

| Indicator | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Transported persons (thous.) | 825 677 | 761 439 | 722 510 | 698 256 | 667 427 | 656 230 | 621 567 | 604 249 | 564 078 | 536 613 | 493 706 |
| Outputs (mil. pers/km) | 11 445 | 10 574 | 11 191 | 11 097 | 9 969 | 8 840 | 7 833 | 8 435 | 8 051 | 8 236 | 7 757 |
| Goods transport (thousand t) | 37 826 | 28 465 | 32 043 | 34 745 | 41 108 | 29 889 | 39 920 | 39 680 | 34 773 | 33 035 | 30 682 |
| Outputs (mil. tkm) | 5 464 | 4 910 | 5 158 | 5 171 | 3 779 | 4 715 | 8 474 | 7 212 | 6 557 | 6 799 | 6 362 |

share of public mass transport. Consumption of liquid fuels represents the highest share, whereas the share of particulate and gaseous fuels and electricity is very low. A slight increase in motor diesel consumption can be attributed to higher demands for road cargo transport. The development in consumption of alternative fuels after 1999 shows significant positive changes in the total quantity of LPG consumed, and this can be attributed to the development of individual car transport.

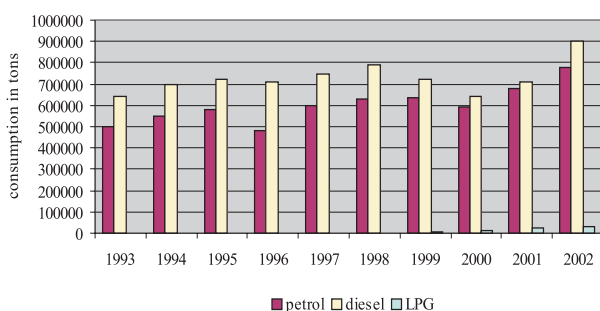


Fig. 1 Developments in total fuel consumption in road transport

Emissions of Pollutants

Development of CO₂ emissions in Slovakia is still higher than the level estimated by pessimistic scenarios of the National Plan for Stabilisation and Decrease of Carbon Dioxide Emissions (CO₂) in Slovak transport for 2010. This is a continuation of the adverse tendency that started in 2001 after the preceding positive development in CO₂ production in transport witnessed in 2000. This adverse development is determined by the increase in fuel consumption in road transport (car petrol by 5.6%, motor diesel by 19.3 % and LPG by 23.6 %) and higher sales of new passenger vehicles.

Waste from Road Transport

A transport waste refers to a movable item, mentioned in Annex 1 of the Act of the National Council of the Slovak Republic No. 233/2001 Coll. concerning waste and amendment of certain acts, its holder disposes, intends to dispose or is obligated to dispose in accordance with this Act or other special regulations. In most cases, this involves harmful waste (parts of decommissioned means

of transport, batteries, parts of exhaust systems of motor vehicles, greasing agents, fuels and similar). Analyses of waste compositions show that waste generated by road transport includes mostly ferrous metals (65-80%), non-ferrous metals (6-6.5%) and tyres (4-5%).

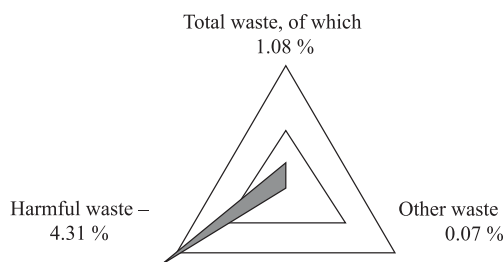


Fig. 2 Share of transport in total volume of waste generated in 2002 (in %)

Number of Accidents and Number of Casualties in Road Transport

An accident is an event caused by a movement of a road transport vehicle resulting in casualties or injuries to health or property no matter whether this event was classified as a crime and/or offence and whether it was brought before a court or a penal commission of a Traffic Inspectorate. Despite of the optimistic decreasing development in the rate of traffic accidents over the period of 1996 to 2000, the following period failed to confirm this tendency. The number of accidents in 2001 and 2002 increased in Slovakia approximately by 10,000 and this trend can be seen also in 2003.

Conclusion

With regard to the anticipated process of economic revival in the Slovak Republic combined with a subsequent increase in the standard of living of its inhabitants, it is necessary to take into account a continuous development of road transport in the future and related increase in fuel consumption resulting in increased production of CO₂ emissions from traffic operations in Slovakia. Negative tendencies associated with such development can be kept at present within acceptable limits only by means of restrictive measures taken by governments focusing on reduction of national expenditures and increase in national revenues in the national budget, by means of increasing vital cost items of inhabitants that

Number of Accidents and Number of Casualties in Road Transport

Table 4

| Indicator | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Number of accidents | 50 159 | 53 436 | 60 536 | 75 607 | 64 854 | 57 452 | 55 683 | 50 930 | 57 258 | 57 060 | 60 304 |
| Casualties | 584 | 633 | 660 | 615 | 788 | 818 | 647 | 626 | 614 | 610 | 645 |
| Severe injuries | 2 736 | 2 603 | 2 791 | 2 691 | 2 871 | 3 121 | 2 684 | 2 205 | 2 367 | 2 213 | 2 163 |
| Minor injuries | 8 682 | 8 391 | 8 782 | 8 927 | 9 676 | 9 771 | 8 782 | 7 891 | 8 472 | 8 050 | 9 158 |

would have restrictive effects on developments of individual motorization and the closely associated negative development in fuel consumption. Maintaining this process within the limits of sustainability is an important challenge of the present times.

The contribution was elaborated into solution of project VEGA 1/2615/05 – Economic and qualitative changes and synergic influence on Transport and Logistics after Slovak Republic EU accession.

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