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## **Annual Report 2001**

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## SELECTED RESEARCH TOPICS

### COMPLETED IN 2001

#### *Division of Automotive Engine and Exhaust Emission Technology*

**Ref. number:** 252-038-1-0

**Title:** Accomplishment of the development of technological and measurement techniques assuring the viable execution of tests in accordance with the EU directives to be adopted by the harmonisation of laws for the type approval test and control of production (abbr.: COP).

**Responsible leader:** Dr. Tamás Merétei

**Contributors:** Attila Tamási; Mihály Kardos; József Kis; Zoltán Oláh; István Czéh; János Jaksa.

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 15.12.2000 – 29.03.2002.

**Abstract:** Amendment №. 98/69 of Directive 70/220 requires the appropriate air conditioning of the measuring site for the emission test of passenger cars. The amended directive will be made effective by Hungarian law next year (2003). The air-condition of the laboratory for driving cycles was designed and constructed in accordance with the requirements. Thus the laboratory of the Division of Automotive Engine and Exhaust Emission Technology is capable of carrying out those exhaust emission tests already prescribed in the EU and which will also be effective in Hungary. The principles of the air-conditioning, based on the Directive, can be summarised as follows:

- to maintain the air temperature in the laboratory at  $-7^{\circ}\text{C}$  ( $\pm 3^{\circ}\text{C}$ ) during the preconditioning and the testing period of the vehicle, in order to be able to carry-out test-VI;
- to ensure an air temperature in the laboratory of  $+20^{\circ}\text{C}$  ( $\pm 3^{\circ}\text{C}$ ) during the preconditioning and the exhaust emission measurement of test-I;
- to maintain an air temperature in the laboratory of  $-20^{\circ}\text{C}$  ( $\pm 2^{\circ}\text{C}$ ) for the execution of the cold starting test.

The main factors determining the acclimatisation of the laboratory for driving-cycles were as follows:

- sandwich structure thermo-insulating panels;
- elements of the air-ducting suspended ceiling;
- electrically operated sluice-gate entrance;
- two opening doors;
- thermo-insulated windows;
- parts of the air-technological system, e.g. air-compressor, air-cooling/refrigerating unit, fittings for air cooling, etc.

The set-up procedure, calibration and corrections needed were all carried out and the following controlled:

- heat-insulating features of the walls, windows and doors;
- the steady maintenance of the above mentioned temperature values held by the air-conditioning unit, and
- operational reliability and safety.

This controlling operation also includes the exhaust emission tests of passenger cars.

The following were verified and proved:

- the air-conditioning unit is capable of cooling down the ambient temperature of +20°C to the prescribed -7°C measured at the engine oil pan of the vehicle during a cooling period of one hour,
- the unit is also capable of maintaining the above temperature value during the desired period of time and
- is capable of holding the above temperature stable between the required tolerance limits during the urban driving-cycle.

**Key words:** exhaust emissions, cold start, analysis of gases, emission limits.

**Ref. number:** 252-041-1-1

**Title:** Elaboration of the regional and local emission inventory for the national transportation branches of road, rail, air and inland waterway transport for 1999.

**Responsible leader:** Dr. Tamás Merétei

**Contributors:** István Antal; József Kis; Zoltán Oláh; János Jaksa; István Czéh.

**Commissioners:** KöM

**Consultants of the Commissioners:** Ms. Zsuzsanna Bibók.

**Starting and finishing dates:** 17.09.2001 – 17.12.2001.

**Abstract:** The emission inventory relates to the most significant harmful components, i.e. CO, CH, NO<sub>2</sub>, SO<sub>2</sub>, Pb, CO<sub>2</sub> and particulates found in the exhaust emissions of the power sources - basically IC engines - of road, rail, air and waterway vehicles, as moving sources of emissions operated in the most important branches of transport. The calculation of the emissions of air polluting substances was carried out for:

- the total area of the country,
- each county,
- each county seat, and
- each area of land of 20x20 km<sup>2</sup>.

In the case of road and rail transport, the calculation of the emissions is founded on the transport output, the specific emission coefficients of each vehicle type and the total length of the road or rail network. Emissions were determined separately for each vehicle type. In the case of air transport, only those emissions were determined which could be calculated from the so-called LTO cycle, i.e. landing-rolling in/out – take off sequence at *Ferihegy* airport, taking into account the number of take-offs (traffic data) and the average specific emission values of the types of airplane using the airport. In the case of the traffic on the inland waterways, the shipping traffic on the Danube, the *Tisza* and Lake *Balaton*, as well as the length of the waterways, were taken into consideration; the emissions were determined using the fuel consumption and relevant specific emission values.

The emissions of the transportation for the year 1999 are shown in the following table; the dominance of the road transport is clear.

**Emissions of the Hungarian transport in 1999,  
according to transport branches and as a total [ton/year]**

Harmful substance Branch	CO	CH	NO <sub>2</sub>	SO <sub>2</sub>	Pb	Particulate	CO <sub>2</sub>
Road transport	446 527	61 525	99 073	2247,7	6,42	19 354	10 080 958
Rail transport	1428,8	471,3	6662,6	400,2	-	52,7	303 660
Transport by air	178,5	161,2	242,2	22,0	-	11,8	69 286
Transport on waterways	2254,7	1578,5	6558,2	180,1	-	489,5	377 416
<b>Total</b>	<b>450 389</b>	<b>63 736</b>	<b>112 536</b>	<b>2850</b>	<b>6,42</b>	<b>19 908</b>	<b>10 831 320</b>

By evaluating the nationwide emission values of road transport in previous years, the decreasing trend in the emissions of CO, CH, SO<sub>2</sub> and Pb is unambiguous, whereas the emissions of NO<sub>x</sub>, particulates and CO<sub>2</sub> show a small increase.

**Key words:** emission register, emission of harmful substances, specific emission coefficients, emissions causing green-house effect.

**Ref. number:** 252-043-1-1

**Title:** Licensing and operation of small vessels and pleasure boats; the pertinent conditions of environmental protection.

**Responsible leader:** Mihály Kardos

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 01.05.2001 – 05.12.2001.

**Abstract:** The study and harmonisation of draft 94/25/CE of the EU with the Annex of draft ministerial order 1998/A KHVM was carried out. The aim of the study was to bring into accord the text of the above mentioned draft on the “conditions of environmental protection of licensing for the operation and use of powered small vessels and pleasure boats” with EU draft Directive 94/25/CE within the framework of law harmonisation. The regulating principles of each draft are similar. The EU draft would be approved in approximately 2005, which means that more amendments could be made, which, in turn, would demand a similar harmonisation process.

The goal is that the character and the effect of the EU directive and the national regulation which will be binding in the future be identical.

Vessels equipped with CI engines are classified into three categories by the EU according to the engine types:

1. two-stroke SI engine (SI: spark ignition),
2. four-stroke SI engine,
3. CI engine (CI: compression ignition, i.e. Diesel)

Further classification is by installation of the engine:

- outboard, and
- inboard.

The final text of 94/25/CE (COM [2000/639]) was drafted by the Commission with particular thoroughness (date 12.10.2000).

This draft directive contains the unified prescriptions to be laid down by the competent authorities and the technical requirements, as well as the adaptive measures to be carried out by the Member States. The directive will have a binding effect for the EU members.

The design and construction requirements for pleasure boats are laid down in directive 94/25/CE. The directive is effective from June 1998 and allows a transition period of four years.

The requirements relate to the exhaust and noise emissions of pleasure boat engines.

Limit values are laid down and differentiated according to the following:

- CO, CH, NO<sub>x</sub> and PM (particulate matters): there are different limit values for two-stroke and four-stroke SI engines and CI engines, as well as for different classes of output ;
- the noise emission limits for pleasure boats are determined according to the following:
  - nominal power,
  - engine type (i.e. SI or CI, 2 or 4 stroke),
  - installation (inboard, outboard, sideboard, one or more engines).

A mutual navigational regulation concerning the protection of the environment, concluded by the competent authorities of Switzerland, Germany and Austria, has been effective on Lake Constance since 1993. Switzerland passed a separate national regulation of emissions for pleasure boats in 1996 but the enactment date of 01.01.1999 was postponed because of the expected uniform EU regulation. Numerous member states of the EU are planning to introduce similar national regulations. But the regulations effective at national level hinder the development of free commerce and economy. The representatives of international commerce

and the member states have requested that the EU harmonise the emission limits, thus assuring the free sale of engines for pleasure boats on EU territory. It is noted that about 3,628,000 powered pleasure boats are in use in the EU.

**Key words:** pleasure boats, outboard engines, inboard engines, limit values.

**Ref. number:** 252-044-1-1

**Title:** Strategic environmental impact assessment of the national Danube transport corridor as a part of the European transportation network. Part II.

**Responsible leader:** Dr. Tamás Merétei

**Contributors:** Ms. Mária Bíte Dr.; Ms. Ágnes Mészáros-Kis; Tibor Bodnár; Dr. Péter Holló; Mihály Békefi; Ms. Emőke Magyar; Dr. Ernő Pál; Gyula Simon; Dr. Attila Vörös; Ms. Éva Hingyi; Dr. József Zoller; Dr. Tibor Várkonyi.

**Commissioner:** KöViM

**Consultant of the Commissioners:** Dr. Miklós Szoboszlay.

**Starting and finishing dates:** 15.04.2001 – 15.11.2001.

**Abstract:** In the first part of the project, an analysis of the present situation was carried out. Based on the results, the basic and hazardously problematic question-complexes of environmental protection, ecology and sociology were finalised, in addition to the characteristic indices for their evaluation.

A preliminary assessment of the transportation network, the traffic volume and the vehicle fleets as well as the relevant emissions was carried out, taking into consideration the goals of economy and transport policy; at the same time, calculations were also made of the short-, mid- and long-term loads on the environment, i.e. for 2008, 2015 and 2030 respectively, caused by the transport branches. The expected basic environmental question-complexes have been identified and their solutions proposed. For the elaboration of the short-, mid- and long-term prognostics, the following were taken as basic components:

- the transport political goals of the transportation and its branches,
- the development plans of the transport networks and traffic, and
- the future plans of the economic and territorial development at national and regional levels.

With regard to road transport, the road network, the development of traffic, the vehicle fleet and the projected limit values of the emission regulation were taken into consideration when assessing the emission of the harmful substances in the Danube transport corridor, with the different emission prescriptions also being taken into account. One important conclusion of this investigation of the impacts was that the intended domestic application of the emission limits introduced already or before introduction in the EU would probably counterbalance the emission increasing effect of the predicted increase in road traffic. Therefore, numerous measures in the fields of traffic engineering and road construction would have to be taken to ensure an environmentally sustainable road transport. Rail transport should be unconditionally strengthened in the region of the Danube corridor. A significant transfer from the roads to the railways in the section between Budapest and our western border in the Danube transport corridor could only be expected in the short and mid terms. Assuming that the importance of the logistic centres would continually grow in relation with the expected decrease in the transport demands by road, it could be predicted that transport by road could be reduced by organising appropriate transport structures.

With regard to the question of sustainable mobility, an important role should be predicted for the widespread and as early as possible use of environmentally ever up-to-date motor vehicles, the reduction of travelling demands and the organisation of transportation and traffic engineering. The aspects of nature and land protection should be taken into consideration when

- the trajectory of the expressway and main road networks would be outlined, and
- the site of the logistic centres selected.

The solution of the problems of environmental protection in connection with the transportation in the Danube corridor is an extremely complex task which requires the ability to foresee long-



term developments in the field of the design and building of transportation systems and in the monitoring of the environmental indicators.

**Key words:** transport policy, impact assessment, indicators of environmental protection, transport network, sustainable development.

**Ref. number:** 252-046-1-1

**Title:** Qualitative investigation of particulate matters emitted by diesel engines.

**Responsible leader:** Mihály Kardos

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 15.06.2001 – 05.12.2001.

**Abstract:** After carrying out the measurements in accordance with the “*conventional*” EU test sequence, the distribution by dimension and number of the particulate matter was successfully determined using an instrument operating on the principle of scattering of the laser ray, type *APC-302A* made by SzKFI and by the assistance of a new software. The dimensional and numerical distribution of particulates is a novelty. Until now, the particulates have been measured in mass/cycle (standard of EU) or in total mass/km (distance 11.6 km). Now there is the possibility to achieve the total emitted mass of particulates based on their number. A comparison was also made between the results of the two tests with different principles of measurement. One important result of the measurement and the arithmetic method of gaining particulate mass is the distribution by mass of the particulates and the total mass from it.

The measurement of the emitted mass by the standard ECE driving cycle on dynamic test bench shows the mass values gained by the filter paper method.

If we make measurements simultaneously with the “*classic*” method and the ray-scattering method mentioned above, the total particulate mass is divided in nine groups according to its dimensions. Adding up the nine resulted values gained by calculation gives the total mass. A difference of about 10% can be seen in comparison with the results by filter paper.

Simultaneous mass measurements with the filter method and the measurement and calculation of particulate numbers in the 0.3 to 100  $\mu\text{m}$  range in nine intervals were carried out at constant speeds in steps between 50 and 120 km/h on a vehicle dynamic test bench. Thus the number and conversion to mass of the particulates was also determined arithmetically.

**Key words:** conversion of particulate sizes to mass, control of particulate matters, particulate size, scattering of laser rays.

**Ref. number:** 252-047-1-1

**Title:** Investigation of the effect of fuel composition on emissions.

**Responsible leader:** Mihály Kardos

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 15.06.2001 – 17.09.2001.

**Abstract:** The testing of the impact on the emissions was carried out with representative samples taken from different fuel stations. After changing the fuel, a measurement of 10 minute duration followed. Then so-called “*individual*” driving cycles, with constant speeds of 50 km/h and 120 km/h were driven, respectively. The specific emission coefficients were determined and the test results evaluated. The  $P_n$  mass emission was also determined by the standard EU (ECE+EUDC) driving cycle test and at constant speeds of 50 km/h and 120 km/h. The evaluation was made by calculation of the results. The emission of fine particulates was measured with the *APC-302A* type particulate counting and classifying device during the above-mentioned tests. The measurements were evaluated by the *APC* measuring software. Three vehicle type were tested, which in our opinion, might represent the national passenger car population. They were a Dacia D-1310 TL, a Suzuki Swift 1.3 GLX and a Ford Mondeo 1.8 TD equipped with a swirl-chamber diesel engine. The effects of the fuel used are characterized by a

7 to 10% variation of the emission coefficients, depending on the varying conditions of operation. The emission of particulates was investigated between the sizes from 0.3 to 100  $\mu\text{m}$  and the effect of the fuels shown was clearer.

The following exhaust components were investigated and their emission coefficients determined: HC, NO<sub>x</sub>, CO, CO<sub>2</sub>, HC+NO<sub>x</sub> and P<sub>m</sub>, the last one being measured by the filtering method. The coefficients are given in g/km unit. The emission coefficients of the various fuels were measured under similar physical conditions. A detailed comparison was executed by the classification of the particulates by their size.

The APC-302A particulate counting and classifying device has the capacity to count the particulates in nine categories in the size range from 0.3 to 0.100  $\mu\text{m}$  during 1 sec sampling time in the whole spectrum. During the ECE 15 + EUDC driving cycle on a length of about 11 km and 1200 secs, the particulate emission could be continuously analysed. The driving cycles of constant speed were carried out at 185 and 85 km/h, respectively.

The best emission coefficients were produced by the ESSO fuels at the 50 km/h, 120 km/h and ECE 15 + EUDC driving cycles, but on the contrary, the P<sub>m</sub> values were higher than for other fuels. In the case of vehicles with gasoline, the mass of the particulate emission is very low for the Suzuki Swift GLX 1.3, but for the old Dacia TL 1310 with a carburettor engine and a long life of 110,000 km, the particulate emission was high, caused also by its high consumption of lubricating oil. The fuels produced by MOL Inc. showed the highest particulate emission in the case of diesel fuels. The sulphur and benzene content of the fuels is in accordance with the EU requirements currently in force, but a reduction in the sulphur content (50 mg/kg) would be desirable, as it would in the case of the benzene content as well.

**Key words:** sulphur, benzene, floating solid particulates in the air, APC-302A, ECE+EUDC driving cycle.

**Ref. number:** 252-048-1-1

**Title:** Participation in the development of the unified European models of calculation for the determination of the air pollution caused by road transport (Assessment and Reliability of Transport Emission Models and Inventory Systems – ARTEMIS).

**Responsible leader:** Iván Pollák

**Contributors:** Dr. Tamás Merétei; Mihály Kardos; Attila Tamási; József Kis; Zoltán Oláh; Tibor Mocsári; Ms. Erzsébet Hóz; György Horváth.

**Commissioner:** KőViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 01.03.2001 – 15.12.2001.

**Abstract:** The ARTEMIS research theme forms part of Programme № 5 of the Technological Research and Development of the European Union; its aim is to elaborate in international co-operation the database of the future emission coefficients of the vehicles and the right models to calculate the emissions. The scheduled period of the research is from the year 2000 to 2003.

The theme is sponsored by the KőViM and research was carried out in four fields in 2001:

- WP300: “Methodology to determine the system of emission coefficients for passenger cars and light trucks”;
- WP400: “Development of the model of the emission coefficients of heavy commercial vehicles”;
- WP500: “Emissions of two-wheeled motor vehicles”;
- WP1000: “Determination of the relationship between traffic conditions and vehicle emissions”.

The harmonisation of the work to be done and the reporting on the results of the tests was performed at international meetings of experts, three of which were held in the KTI.

In the frame of the WP300, the following tasks were carried out:

- organisation and construction of the measuring equipment and preparation of the measurements;

- measurements and their evaluation in the following:
  - subtask № 3122: “Evaluation of the stability of the measured values”;
  - subtask № 3124: “Testing of fuel properties”;
  - subtask № 3142: “Evaluation of the use of gear-box”.

In the frame of the WP400, the measurements planned for the RABA diesel engines of EURO-II emission level were carried out and the preparation of the measurements planned for the EURO-III engine was completed.

In the frame of the WP500, the preparation of the “Round-Robin” test was carried out i.e. firstly the harmonisation and testing of the driving cycles. Thereafter the “Round-Robin” test series was completed at each participating institute, thus at the KTI, too. The control unit of the motorcycle test bench, designed and constructed by KTI, i.e. its hardware and software, has been modified in accordance with the requirements of the measurements also to be modified in the future.

The test series and the evaluation of the results will be continued in the following years.

**Key words:** emission of pollutants, air pollutant substances, data base of emission coefficients, passenger car, goods vehicle (truck), two-wheeled motor vehicle, emission register.

**Ref. number:** 252-051-1-1

**Title:** Representation of Hungary in the Groups of Experts of the UN-ECE Working Group WP29, responsible for the drafting of the harmonised world regulations for the construction of road vehicles.

**Responsible leader:** Iván Pollák

**Commissioner:** KöViM

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 01.01.2001 – 15.11.2001.

**Abstract:** After preparing the draft of the national standpoint and harmonising it with the competent division of KöViM in accordance with the adopted working plan, we participated in the 41<sup>st</sup> and 42<sup>nd</sup> sessions of the GRPE group of experts of the UN-ECE held on 16<sup>th</sup> to 19<sup>th</sup> January and 28<sup>th</sup> May to 1<sup>st</sup> June, respectively. The sessions were reported, and oral reports on international activities concerning the reduction of emissions were also given at these meetings, organised jointly by the KöViM and GM. Of the subject matters discussed at GRPE level this year, three are worthy of attention:

1. The first proposal of the future driving cycle was drafted by the WHDC working group as the preparatory body of the subject. The subject is a part of the amendment of UN-ECE Regulation № 49 for testing and approving the emissions of diesel engines of motor vehicles more than 3.5 to GVW. The tests for the implementation of this new driving cycle have commenced.

2. A joint Subcommittee was formed by ISO, Un-ECE/GRPE and EU/MVG to draft a proposal for the conditions of application of the amendment mentioned under point 1. The full text of these new requirements, which will also be published as an ISO Standard, was transmitted to all competent national organisations. A new subcommittee has also begun the study concerning the modification of the principle of the test method of the particulate emissions and the laying down of the proposal for the amendment of Regulation № 49 in this respect.

3. The draft of a new world regulation on the emissions of motorcycles was elaborated by the WMTC committee and is now at the stage of the harmonising process. In the next months it is expected that the three most interested parties, i.e. the competent bodies of the USA, Europe (EU) and Japan would agree on the new driving cycles for the type approval test of motorcycles.

**Key words:** environmental protection, type approval test procedures for motor vehicles and engines, international co-operation.

**Ref. number:** 252-053-1-1

**Title:** Work performed in the Working Group on Transport and Environment of the Economic Commission of Europe (ECE) of the United Nations (UN) and the provision of the tasks assigned to the national coordinating body, the “Focal Point”

**Responsible leaders:** Iván Pollák.

**Contributors:** Dr. Tamás Merétei; György Horváth.

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 31.03.2001 – 10.12.2001.

**Abstract:** The 1997 Conference of the Ministers of Transport and Environmental Protection held in Vienna adopted a Plan of Measures for the execution of the tasks contained in the Joint Action. A so-called “Focal Point” was designated to each participating country for mutual information and to harmonise the actions. KTI is the national Focal Point designated by the KöM and KöViM. An overwhelming part of the work laid down in the Joint Action was carried out this year.

The UN-ECE Transport Secretary issued a questionnaire, which was filled out and harmonised with the competent national bodies before being returned. The secretary registered this in the official documentation.

We participated in the meeting of experts of the POJA Focal Point and cooperated in the shaping of the standpoint agreed on the fourth joint session of the Transport and Environment.

The documentation elaborated for the first joint session of the Transport, Environment and Public Health was appraised and evaluated in accordance with our national interests.

The tripartite (transport, environment and health) Group of Experts of the UN-ECE and WHO held its first joint meeting, in which numerous proposals were discussed in the group of themes “Priorities” and “Possibilities”. The main subjects of the “Priorities” were:

- unification of the tripartite aims (involvement of the subject health at all levels);
- promotion of road traffic which is both environment-friendly and harmless to health; and
- urban traffic (its sensible features).

The “Possibilities” group includes the rationalisation of parallel activities (Paris and London), i.e. the establishment of the so-called “Framework Convention”, which has so far been encouraged but not yet adopted.

Austria has offered to organise a meeting from 24<sup>th</sup> to 25<sup>th</sup> January 2002 for the documentation of the above-mentioned proposals.

Further national steps needed:

- unified (tripartite) national standpoint, its shaping and representation in Vienna;
- elaboration of a draft to be submitted to the POJA concerning the content of the national report for the year 2002.

The working documents compiled for the Subcommittee of the National Working Group on Environmental Protection of the OECD were subject to our comments. After reconciliation at national level, the standpoints, agreed by the two Ministries, were represented at OECD level.

A proposal concerning the application of the “EST” principles of the OECD in the development of the urban transport in Hungary was drafted and submitted. We have also co-operated in other international topics related to this theme (EU-EEA, Middle-European Initiatives, REC, etc.).

**Key words:** environmental protection, international co-operation, POJA.

**Ref. number:** 252-054-1-1

**Title:** Hungarian co-operation in the research programme “To promote the use of low-emission vehicles” carried out in the frame of the OECD-RTR working programme on transportation.

**Responsible leader:** Iván Pollák

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 10.05.2001 – 10.12.2001.

**Abstract:** The OECD decided to complete a study summarising the results of the international research carried out in accordance with the working project for the years between 2001 and 2002 of the subject Research on the Road Transport of the OECD (closing term 2002).

The introductory conference was held in Paris on 31<sup>st</sup> May and 1<sup>st</sup> June 2001, and, after a detailed discussion, the partners agreed on the structure and content of the study. The Hungarian delegate reported on our contribution.

The questionnaire compiled for the OECD's road transport experts was harmonised and later adopted by E-mail. On the basis of the harmonised questionnaire, we have compiled and submitted the data concerning the low emission vehicles used in Hungary and reported on the situation at home. The first variation of the first chapter of the study was prepared. Our task is also the compilation and survey of the international regulations in this theme, as well as a review of the draft regulations under preparation by the international organizations, e.g. UN-ECE, EU, and the USA and Japan. A proposal concerning the definition of low emission vehicles was drafted.

**Key words:** low emission vehicles, particulate size, air pollution, environmental protection.

*Aut-O-Mat, Division of Vehicle Operation and Maintenance*

**Ref. Number:** 273-537-1-1

**Title:** Elaboration of tasks attached to the replacement of the standards relating to motor vehicle traffic within the framework of the theme: „Tasks related to the technical regulation in motor vehicle transport”.

**Responsible leader:** Dr. Tibor Gál

**Commissioner:** KöViM

**Consultant of the Commissioner:** Károly Pongrácz

**Starting and finishing dates:** 25.05.2001 – 05.12.2001.

**Abstract:** In accordance with Article 6, paragraph (1) of Law XXVIII/1995 which annulled Article 6, paragraph (1) of Government Regulation 42/1994(III.15.) on the same subject, “application of national standards is voluntary, unless a statutory provision stipulates compulsory use”.

In order to overcome existing insufficiencies in obligatory technical regulation, KHVM Decree 27/1994.(IX.29.) on declaring some national standards on transport, communication and water management mandatory was elaborated. The Ministry specified the list of mandatory standards, however, no other effective statutory rule refers to them. The relevant statutory rule was amended several times, and its obligatory application extended to 31<sup>st</sup> December 2001.

In order to complete the task, 38 standards on motor vehicle transport (KHVM Decree 27/1994.(IX.29.), Annex 1.1) and 6 standards covering local public transport were studied in respect to punctuality and obligation, and a detailed proposal was prepared on how to replace their mandatory character. Most of these standards deal with technical requirements on, and control of the accuracy of motor vehicle testing equipment. To replace them, and also to complete the research theme: “Elaboration of the technical requirements and calibration-related regulation of the instruments used in motor vehicles’ measurements with legal effects”, which has already been studied for several years, the researchers proposed and elaborated the revision of KHVM order 1/1990.(IX.29.) covering the personal and material conditions of the vehicle maintenance activity. Following large scale harmonisation, the revised KöViM order № 37/2001(XI.14.) was issued. Taking into consideration the developments of recent years (e.g. publication of revised orders № 1/1990(IX.29.)KHVM; 6/1990(IV.12.) KöHÉM, as well as the new MSZ EN and MSZ, standards etc.), a table summarising the standards that ceased to have obligatory effect by the deadline set according to the relevant KHVM order 27/1994.(IX.29.) was prepared. The table, with reference to each standard, indicated the mode of replacing its obligation and proposed status, subsequent to the expiry of its obligation.

The comprehensively manageable database, presenting the status of the international standards and the appropriate national counterparts in appendices A, B, and C to the KHVM Orders 11/2000(V.24.) and 12/2000(V.24.) has been established. A computer programme has been prepared for the management, inquiry, edition and amendment of the database. The management of the database and the programme are available in written form and on CD-ROM.

**Key words:** standardisation, calibration of motor vehicle testing instruments, substantial terms of motor vehicle maintenance, foreign norms of EU directives.

**Ref. number:** 273-555-1-1/7.2

**Title:** Development of the methods and devices to be used in the technological tests concerning the instruments applied in the periodic technical inspection of motor vehicles, with special regard to the control of the programmes on the processing and assessment of the measured data in order to create the basis of the harmonised evaluation.

**Responsible leader:** Imre Dobos

**Commissioner:** KöViM

**Representative of the Commissioner:** Géza Kározy

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 01.07.2001 – 30.09.2001.

**Abstract:** The technical characteristics of the instruments used in the periodic technical inspection of the roadworthiness of motor vehicles have changed to a great extent recently, especially with the widespread use of computerised measuring and data processing systems, as well as the introduction of new equipment. From the point of view of the authorities, the demand for the development of those procedures and devices, which enhance the technological suitability of the different equipment, has increased, and thus it is possible to avoid obtaining different measuring results for the same physical phenomenon when various products are used. The purpose of this year's topic was the elaboration of unbiased test methods to be used in deciding on the suitability of the computerised roller test bench.

The work has been helped by the publication of the Transport Inspectorate's booklet dealing with the harmonised brake test technology in the official inspection of road vehicles, providing for the unified evaluation method and algorithm of the mandatory tests and test results. With the introduction of the uniform algorithm it became possible to test and rate, in the periodic technical inspection of motor vehicles, the computerised roller test bench systems of different makes in comparison to the algorithm as a standard.

Accordingly, within the framework of the topic such test methods have been elaborated as are appropriate for the determination of the technological suitability of the computerised roller test benches to be prepared on the basis of the algorithm of the uniform brake test technology of the official tests of road vehicles. In addition, a computerised programme of such a nature has also been elaborated, as will help determine unequivocally whether the device operating, data processing and evaluating software implements completely the new brake-testing algorithm. The CD recorded programme installed on a mobile computer also makes possible the fast local control of the programmes on braking force measurement.

**Key words:** motor vehicle, road safety, periodic technical inspection, brake test, computerised measurement, roller braking force test bench.

**Ref. Number:** 273-547-1-1/7.3

**Title:** Ensuring the expertise background for different technical and information tasks related to the application of the tachograph, the reading and central processing of the data.

**Responsible leader:** László Faragó

**Commissioner:** KöViM

**Representative of the Commissioner:** Géza Kározy

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 31.07.2001. – 14.12.2001.

**Abstract:** AETR, the European Agreement concerning the work of crews of vehicles engaged in international road transport, was enacted by Law IX of the year 2001. In compliance with the Agreement, its member countries are compelled to control its observance, keep records on this control and also to publish the data. In order to solve the tasks of ensuring the technical and information background for the reading of the data provided by the tachograph, and its application, a collaboration activity was realised together with the Chief Transport Inspectorate, which co-ordinated the demands of the transport inspectorates in Budapest and in the different counties authorised for official control.

Firstly, the solutions serving for reading the data provided by the data recording unit of the tachograph (until 2004 the traditional tachograph disc is expected to play the only role of this unit, and notwithstanding the introduction of the driver's chip-card, still to be in parallel use for ten years at least) were surveyed, and confirmed whether these solutions were suitable for further development, namely that they were appropriate for reading the drivers' card and the

data recorder installed into the vehicle. The Chief Transport Inspectorate was informed about the findings of the survey.

In compliance with the plans of the Chief Transport Inspectorate, mobile road surveillance stations have to be established. The relevant task was carried out by presenting a proposal concerning the main technical parameters of the station. These suggestions were used by the Chief Transport Inspectorate's invitation for tenders for the installation of mobile road surveillance stations.

The vehicles transformed into mobile road surveillance stations equipped with the necessary installations to be purchased on the basis of invited tenders are not yet supposed to be prepared for the transmission of the test results using the methods of information, however this demand was taken into account when the proposals on installation were submitted.

**Keywords:** tachograph, AETR Agreement, international road haulage, road surveillance.

**Ref. Number:** 273-550-1-1/7.6

**Title:** Processing of EU directives – issued in the years 2000 and 2001 on the subject of road safety – required for the harmonisation of technical provisions on road vehicles.

**Responsible leader:** József Dabi

**Commissioner:** KöViM

**Representative of the Commissioner:** Géza Kározy

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 01.07.2001 – 14.12.2001.

**Abstract:** Within the framework of preparing for EU accession, with the amendment of the national statutory provisions relating to road vehicle engineering, the technical requirements and type approval procedures of the EU directives applied to road vehicles, which were accepted in 1998, entered into force as part of the activities aimed at law harmonisation.

As a result of the improvement of the EU directives, the changes and the new directives should be processed and adapted to the national provisions on road vehicles. This activity has already commenced at the time of adapting the basic directives and is continuing, both in relation to the orders concerning the technical inspection of road vehicles and the technical conditions of their entering into, and maintenance in operation. Different appendices and annexes containing the technical requirements and type approval procedures adapted in the course of law harmonisation are modified by new directives.

Within the framework of the study, the new directives issued in the second half of the year 2000 and in the year 2001 were elaborated and introduced into the relevant statutory rules. Amendments entered into force by order of the minister of transport and water management.

**Keywords:** motor vehicle, law harmonisation, road safety, legislation.

**Ref. Number:** 273-552-1-1/7.9

**Title:** Establishment of the national legislative background of the introduction of procedural order: "Tempo 100".

**Responsible leaders:** József Dabi

**Contributor:** Gábor Brett

**Commissioner:** KöViM

**Representative of the Commissioner:** Géza Kározy

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 01.07.2001 – 14.12.2001.

**Abstract:** In Hungary, Article 26, paragraph a/1 of the joint KPM-BM order 1/1975.(II.5.) relating to road traffic rules (KRESZ /Hungarian Highway Code/) allows for a speed of 100 km/h (hereinafter: increased speed) for buses on motorways, in cases where the other requirements of KöHÉM order (MR) 6/1999.(IV.12.) on the entering into and maintenance in traffic of road vehicles are met.

In order to regulate permission for the increased speed, proposals were submitted:



- For the revision of the order referred to by the KRESZ, and in connection with this, in the field of the procedure of the permission, for the revision of KöHÉM order (ER) 5/1990.(IV.12.) on the technical inspection of road vehicles,

- For traffic authorities to specify the detailed rules on permission and control.

The following were specified for the revision of the MR: buses authorised to travel at the increased speed, special technical requirements on buses, numerical indication of the increased speed value, as well as provision for the publication in the ER of the procedural system of the issuance of the permission. Among the arrangements on permission – which are included in the ER amendment – the authority authorised for the issuance of the permission is specified (territorial transport inspectorate), as well as the terms of the issuance of the permission, the provisions on validity, the institutions that may be authorised for the execution of the vehicle tests needed for the issuance of the permission, the authority giving this authorisation (Chief Transport Inspectorate), and the essential implementation aspects of the test.

As a result of the work carried out, a draft statutory provision amending the MR and ER orders, which entered into force, following professional and administrative harmonisation was prepared.

In order to help the transport authority specify the rules on permission and procedure, the following were elaborated in detail:

- Permission procedure including the content, the issuance of the permission and the extension of its validity in the course of periodic inspection and the aspects of implementation of the inspection,

- Authorisation of the professional institution to execute the test under separate conditions, the specified requirements, the content of the expertise describing the test results.

- Requirement for surveying separate technical conditions.

**Key words:** motor vehicle, road safety, legislation, traffic with increased speed.

**Ref. number:** 273-553-1-1/7.10

**Title:** Extension of the periodic road safety inspection to include the test of up-to-date motor vehicle equipment and on-board installations in accordance with EU practice.

**Responsible leaders:** Dr. Ottó Flamisch

**Commissioner:** KöViM

**Consultants of the Commissioner:** Péter Barna

**Representative of the Commissioner:** Géza Kározy

**Starting and finishing dates:** 01.07.2001 – 14.12.2001.

**Abstract:** Within the framework of the objectives of the study, the technical characteristics of the speed limiting devices used in the Hungarian traffic system, the process of the recommended instrumental test and the characteristics of the instruments checking used to this aim were evaluated. Control measurements subsequent to installation were surveyed at the service stations dealing with the mounting of the speed limiting devices. Taking into consideration the requirements laid down in the revised version of KöHÉM Order 5/1990.(IV.12.) and the international regulations, a technological proposal was elaborated for the periodic instrumental control of the speed limiting devices, following which the most appropriate device with an advantageous purchasing price was chosen. A technological recommendation was prepared for the brakes equipped with hydrodynamic and electric retarder and for the visual inspection of the anti-block braking system, completed with some simple measurements (not mandatory, but with efficient results).

**Key words:** speed limiting device, retarder, technical inspection of anti-block systems, road safety.

**Ref. Number:** 273-555-1-1/7.13

**Title:** Improvement of the summarising and systemising document of detailed technological test procedures, taking into account the changes in the rules on periodic vehicle test of the year 2000.

**Responsible leader:** József Dabi,

**Commissioner:** KöViM

**Consultant of the Commissioner:** Péter Barna

**Representative of the Commissioner:** Géza Kározy

**Starting and finishing dates:** 01.07.2001 – 14.12.2001.

**Abstract:** Recent international and national regulations on periodic vehicle inspection were explored for the improvement of the summarising document covering the detailed technological rules on periodic vehicle tests. Of the international regulations concerned, amendments of the EU directive on periodic tests (96/96/EC), some other directives related to periodic tests, and a UN/ECE document on vehicle periodic technical inspection –in the pre-approval stage – as well as recommendations offered by CITA,, the international association concerned with periodic inspection, were studied.

The necessary amendments and revisions of the detailed test technologies (Annex 5 of KöHÉM Order 5/1990.(IV.12.)) were determined, taking into consideration the changes in the international and national regulations. The changes elaborated were introduced into the chapters of the test technology concerned and then new test procedures were developed.

The test systems recommended by the international documents mentioned above were analysed and compared with the Hungarian system of tests from the aspect of the elaboration of the periodic inspection system.

As a result of the analysis, a proposal was prepared for the phasing and separation of the technology of testing commercial vehicles (categories: M2, M3, N2, N3, 03, 04) and passenger cars (categories: M1, N1), in accordance with the test requirements in international practice. Parallel to this, it is suggested that the execution of periodic inspection in the same groups of vehicles should be separated to an even greater extent than is currently the case, which is justified by demand for a more extended test regulated in a more detailed way, resulting from the structural construction of commercial vehicles and from the equipment mandatory from the aspects of road safety improvement.

**Keywords:** motor vehicle, road safety, periodic technical inspection.

### *Documentation and Information Centre*

**Ref. number:** 306-027-2-1

**Title:** Editing and publishing of the quarterly Hungarian language professional journal entitled „*Útügyi Szakirodalmi Tájékoztató*” [= Reference Journal of Road Related Topics].

**Responsible leaders:** Dr. Pál Boros; Dr. Mihály Füredi; Tibor Jakab.

**Contributors:** Dr. Jenő Bodolay; Dr. habil. László Gáspár; Dr. Péter Holló; Tibor Jakab; Mrs. Jenőné Katona; Tamás Radóczy; Dr. László Reznák; Dr. Dezső Rósa; Dr. Ervin Szentés; Tibor Tóth; Dr. Boldizsár Vásárhelyi.

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Ms. Margit Schulz

**Starting and finishing dates:** 01.01.2001 – 31.12.2001.

**Abstract:** During the past year the quarterly Hungarian language professional journal *Útügyi Szakirodalmi Tájékoztató* was published 4 times, with a total of 556 printed pages in A/4 format. The inner structure of the journal has remained unchanged for many years, and consists of three main parts: (1) annotations, (2) abstracts, and (3) some samples from the *ITRD* and *TRIS* databases of *TRANSPORT CD* on a selected central topic. As a result, professional readers can receive new information in their mother tongue quarterly on the latest results published in selected foreign language newspapers and journals, professional literature and databases. Key-words, which cover all three chapters, assist the readers in using this journal.

**Key words:** publishing, information dissemination, information technology, *ITRD*, *TRIS*, *TRANSPORT CD*.

**Ref. number:** 306-034-2-9

**Title:** A selected bibliography of the Hungarian professional literature on bridges, viaducts and tunnels from 1<sup>st</sup> July 1999 until 30<sup>th</sup> June 2001. Second Part.

**Responsible leaders:** Dr. Pál Boros; Dr. Mihály Füredi

**Contributors:** Ms. Lilian Bogdán; Mrs. Lászlóné Igar; Ms. Erika Simon; Ms. Jelena Teleki.

**Commissioner:** UKIG – ÁKMI Kht.

**Consultants of the Commissioner:** Dr. Ernő Tóth, UKIG

**Starting and finishing dates:** 01.01.2001 – 30.11.2001.

**Abstract:** This supplement to an earlier published thematic bibliography contains Hungarian articles, books, standards, dissertations and small publications on bridges, viaducts and tunnels published between 1<sup>st</sup> July 1999 and 31<sup>st</sup> December 2001.

Preparatory work had been carried out as a *MicroISIS* database.

The final product will be published on paper (although it can also be published on floppy disk or CD-ROM). At the end of this part of the thematic bibliography there is a name index, a very detailed and professionally elaborated key-word index, a list of the periodicals and journals processed, and a list of abbreviations used. The earlier bibliography occupies 252 pages in A/4 format, and was published in 100 copies. This supplement will contain an additional 80 pages in A/4 format. The electronic, data base version of the whole thematic bibliography can be used at the KTI Library, and, with its well-known *MicroISIS* tools, can satisfy all professional needs.

**Key words:** publishing, information dissemination, bibliography, bridge, tunnel, viaduct, culverts, database, database handling, *MicroISIS*.

### *Environmental Protection and Acoustics Division*

**Ref. number:** 250-022-2-0

**Title:** Preparation of an environmental impact assessment for the development of *Airport Békéscsaba*.

**Responsible leaders:** Sándor Hajdú; Ms. Ágnes Mészáros-Kis.

**Contributor:** László Veréb

**Commissioner:** Airport Consulting Mérnök Tanácsadó Kft

**Consultant of the Commissioner:** László Fördös

**Starting and finishing dates:** 03.01.2001 – 30.06.2001.

**Abstract:** The environmental impact study deals with the environmental impacts of the planned development of the *Airport Békéscsaba*.

The proposed noise protection areas around the airport was calculated on the basis of

- the map of the airport and its surroundings,
- the parameters of flight paths,
- the standard number of flight operations,
- the division of flight operations by flight paths and category of aircraft,
- the noise characteristics of aircraft.

The researchers proved, on the basis of the environmental impact assessment of the airport, that the adverse effects of the development were not significant, although some potential ecological problems had emerged.

**Key words:** airport noise, noise control, noise level, noise measurement, noise protection area, sonic boom, nuisance, aeroplane, environmental impact assessment, nature protection.

**Ref. number:** 250-029-2-0, 250-035-1-1

**Title:** Research on the implementation of the method of the noise mapping system in residential areas, which can follow the change in noise loads.

Uniform documentation of noise analysis, and preparation of noise maps, based on a model project.

**Responsible leader:** Ms. Dr. Pálné Bite

**Commissioner:** Hungarian Ministry of Environmental Protection

**Consultant of the Commissioner:** Mihály Berndt

**Starting and finishing dates:** 14.12.2000 - 31.08.2001.

**Abstract:** EU COM/2000 Num. 468, „Directive of the European Parliament and the Council relating to the Assessment and Management of Environmental Noise”, proposed the preparation of noise maps and noise abatement planning of larger settlements, main roads and railways, large airports.

The main tasks of the first project were:

- A survey of the noise abatement policy, method of noise analysis and noise mapping of the EU.
- The preparation of the appropriate method of noise maps for different purposes.
- Elaboration of the technique and presentation of drawing up noise maps.

The tasks of the second project were:

- Analysis of the noise immission of a small Hungarian town, Sopron, based on the data of local authorities and KTI noise measurements.
- Elaboration of a noise map of the town, taking into account the planned EU Directive.

- There were some consultations with the leader of the Noise Mapping Committee, Mr. C. Popp.
- Investigation of the possibility of implementing noise mapping harmonised with the EU directive.

The researchers dealt with the technique of drawing up maps and established the direction of further research in connection with road transport.

**Key words:** EU noise policy, noise mapping, EU directive, noise measurement, noise abatement.

**Ref. number:** 250-041-1-1

**Title:** Tasks in connection with road traffic noise protection policy of the EU, and noise protection strategy of the Hungarian railways based on EU guidelines

**Responsible leader:** Ms. Dr. Pálné Bite

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai.

**Starting and finishing dates:** 01.04.2001 - 30.11.2001.

**Abstract:** Based on directive EU COM/2000 Num. 468 (under acceptance), the noise values should be achieved by uniform methods of measurement.

Since the current Hungarian evaluation method differs from the EU method, a new evaluation method based on Hungarian peculiarities has to be prepared.

The Directive proposes the elaboration of classical noise maps at main railways with an impact on residential areas in 3 years. Hungary currently has neither a database of noise loads, nor noise maps concerning railways.

A survey of the current situation at settlements where the noise originated from rail traffic was carried out. Based on the measurements, a database of noise loads and a noise inventory (taking into account the exposed residents) was prepared at 29 settlements, which can serve as the starting point for the determination of the necessary noise abatement process.

**Key words:** law harmonisation, traffic noise, noise map, noise controlling, noise protection, rail traffic.

**Ref. number:** 250-044-1-1

**Title:** Approximation of the Council Directives and the Hungarian laws relating to the permissible sound level of aeroplanes.

**Responsible leader:** Sándor Hajdú

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 01.06.2001 – 10.15.2001.

**Abstract:** The Ministry of Transport and Water Management (KöViM) commissioned KTI with the amendment of ministerial decree 18/1997(X.11.) KHVM-KTM based on Council Directive 92/14/EEC on the limitation of the operation of aeroplanes covered by Part II.Chapter 2, Volume 1 of Annex 16 to the Convention on International Civil Aviation, second edition.

This Council Directive introduces the concept of the "recertificated civil subsonic aeroplanes" concerning the ICAO category mentioned above. The aim of this Directive is to reduce the environmental noise impact caused by the recertificated civil subsonic aeroplanes. The Directive determines how to operate this type of aeroplane at airports of the Member States.

The Hungarian law does not contain these definitions or restrictions. The elaborated draft details how to complete the present ministerial decree to comply with the Directive. The report contains the new wording of Article 11 of this ministerial decree for the accomplishment of the required approximation of the laws of the Member States and Hungary.

**Key words:** permissible sound level of aeroplanes, environmental noise impact.

**Ref. number:** 250-045-1-1

**Title:** Improving the efficiency of procedure concerning the noise measurement and noise-certification of propeller-driven aeroplanes not exceeding 9000 kg.

**Responsible leader:** Sándor Hajdú

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 01.05.2001 – 09.30.2001.

**Abstract:** The law on air services (that is *law XCVII. of 1995*) prescribes that as of 1<sup>st</sup> January 2002 aeroplanes which do not possess appropriate noise-certification, shall not land in Hungary. A method of measuring adopted by the *Hungarian Aviation Authority* to determine the noise emitted by propeller-driven aeroplanes not exceeding 9000 kg based on the provisions of JAR-36 (*JAA-JAR: Joint Aviation Authority - Joint Airworthiness Requirements*) was elaborated in accordance with the terms of the above law during the last year.

The work continued this year in order to achieve a more sophisticated method of measurement. The improved method allows for the measurement to be accomplished in a short time. It is very important because this investigation depends highly on the meteorological conditions. It is also important to avoid the extra expenses which arise out of repeatedly carrying out unnecessary measurements. The improved method is recognised by the Hungarian Accreditation Board.

**Key words:** noise emission, noise level, noise control, airport noise.

**Ref. number:** 250-046-1-1

**Title:** Necessity of subsequent environmental protection measures alongside the motorways and main road network.

**Responsible leader:** Ms. Ágnes Mészáros-Kis

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 01.05.2001 - 20.11.2001.

**Abstract:** Hungarian law LIII of 1995 entitled “General rules of environmental protection” prescribes subsequent protection of nature and environment heavily impacted by traffic.

Comprehensive investigations were carried out of the adverse environmental effects of heavy traffic on motorways and main roads.

The main points of the project were the analysis of the air-, soil- and, water-pollution and noise loads alongside the roads, and the collection of data on the disturbance of flora and fauna.

A database of noise loads at cross-town links was established, considering the estimated number of inhabitants affected.

Based on the evaluation of the investigations some of the measures necessary for the subsequent short and long term protection were proposed, such as construction of by-pass roads, traffic calming, noise barriers, and the collection of further data on the flora and fauna impacted.

**Key words:** environmental protection, adverse environmental effects, air pollution, noise loads, nature protection, main road network.

**Ref. number:** 250-047-2-1

**Title:** Study plan on the noise and vibration emission originating from the South Railway Bridge of Budapest.

**Responsible leader:** Ms. Dr. Pálné Bite

**Contributors:** Dr. Fülöp Augosztinovicz (BME); István Dombi (ÉMI).

**Commissioner:** MÁV Rt.

**Consultant of the Commissioner:** Dr. Tibor Vigh

**Starting and finishing dates:** 01.07.2001 - 30.10.2001.

**Abstract:** This new and urgent project was prepared by a team of experts on the following lines:

- Investigation of the international literature on the noise abatement possibilities of iron railway bridges.
- Measurements of noise and vibration emissions originating from the iron bridge.
- Measurements of noise and vibration loads on the left side of the Danube, in the area of the new National Theatre.
- After an evaluation of the measurements performed, investigations were carried out into the possibilities of noise abatement at the bridge.
- Proposals were offered on noise and vibration isolation design.

The aim of MAV was to reduce the environmental noise of the bridge by at least 10 dBA, but preferably by 12 to 15 dBA with a cost-effective method.

After the evaluation of the measurements considering the possibilities and consultation with experts from Belgium, a common decision on a noise and ground vibration abatement plan was accepted. The noise and vibration isolation of the bridge was carefully designed. Based on the decision, a resilient rail pad with resilient washer, flapped rail pad and rail damper will be built in the railway bridge.

**Key words:** railway iron bridge, noise abatement, vibration isolation, resilient rail pad.

**Ref. number:** 250-051-2-1

**Title:** Detailed environmental impact assessment of motorway M3 between *Polgár* and *Nyíregyháza*.

**Responsible leaders:** Ms. Ágnes Mészáros-Kis; Ms. Dr. Pálné Bite.

**Commissioner:** MOLNÁR Környezetvédelmi Szolgáltató és Kereskedelmi Bt

**Consultant of the Commissioner:** Béla Molnár

**Starting and finishing dates:** 01.06.2001 - 15.09.2001.

**Abstract:** The detailed environmental impact assessment of the motorway M3 investigates the estimated environmental effects of this motorway. Our task was to examine the air pollution, noise loads and vibration caused by the construction and operation of the motorway.

Based on the long-term traffic data, the air pollution and noise load was calculated for the direct and indirect area, and the size of the protective area was determined and presented on a map.

Vibration can be problematical only during construction.

Following the detailed investigation, the mitigation measures were prepared. On the basis of noise calculations, construction of noise barriers were proposed at the residential areas impacted. On the basis of detailed analysis among the three alternatives the „D” variant, which is closer to *Debrecen*, was proposed, because this variant impacts fewer dwelling places.

**Key words:** environmental impact assessment, mitigation measure, noise barrier, motorway construction, noise loads, air pollution.

### ***Bureau for R+D Organisation***

**Ref. number:** 110-100-1-0

**Title:** The exploration of the most important circumstances and the fundamentals related to the logistics function of the Free Port of *Csepel*.

**Responsible leader:** Dr. Ernő Pál

**Commissioner:** KöViM

**Consultant of the Commissioner:** György Kovács

**Responsible leader of the Commissioner:** Dr. István Valkár

**Starting and finishing dates:** 25.09.2000 – 29.06.2001.

**Abstract:** Surveys and analyses have been prepared for the determination of the future role and for the possible evolution of the logistics functions of the Free Port of Csepel, taking the expected freight traffic of the port as well as of the service demand of its most important users into consideration.

On the basis of a detailed analysis of the boundary statistics it could be determined that the railway freight traffic using the logistics function of the Port of Csepel will be 1 million tons in 2005, or 1.25 million tons in 2010, while the expected inland waterway import and export performances will be between 2 and 2.4 million tons.

Approximately 50 % of the waterway transshipment performances accomplished by the Hungarian National Public Port Network will be achieved in the Free Port of Csepel.

The demand for logistics services has appeared for about 15.000 m<sup>2</sup> covered area, 20.000 m<sup>2</sup> free storage place, 2.000 m<sup>2</sup> customs-free area, 655 m<sup>2</sup> and 1,000 m<sup>2</sup> for areas serving industrial activities and further similar demands for a period of about ten years.

In order to achieve the trouble-free service of the increasing traffic demands, the improvement of the railway, road and waterway approaches is necessary, so that the traffic making for the port shall not hinder the accessibility of the district of the town. On the basis of the detailed exploration of the situation and of a survey of the condition, proposals have been elaborated for the development and modernisation of the inner and outer infrastructures of the port at a cost of about 6 billion HUF.

State and international project financing constructions have been elaborated for the development projects.

**Key words:** inland navigation, port development, freight transport forecast.

**Ref. number:** 110-028-1-1

**Title:** The adaptation of the information system used along the Danube to that of the EU, or the preparation of a study aimed at making the conditions prevailing in Hungary correspond to the prescriptions and demands of the EU, and its discussion in the framework of a conference.

**Responsible leader:** Dr. Ernő Pál

**Commissioner:** KöViM

**Consultant of the Commissioner:** Ferenc Ulicska

**Responsible leader of the Commissioner:** Dr. István Valkár

**Starting and finishing dates:** 12.07.2001 – 28.06.2002.

**Abstract:** The Distress Calling Information System on the Danube was established in 1996 on the initiative of the National Chief Administration for Protection against Catastrophes of the Ministry of the Interior (BM), at the National Headquarters of the Civil Defence (PVOP), as well as with the co-operation of the German and Austrian radio organisations.



The building up of the system has aimed at the safety of the Danube waterway and the improvement of the information given to boatmen. The financial resources required for the building up of the system have been covered from own resources, competition sources and from the support given to the Association by the BM PVOP. During the period elapsed since the foundation, the radio-part of the system covering the whole Hungarian section of the Danube has already been constructed.

The development of the information background for the DISR system and the construction of the network connected with it started in 2000. The system has been operated in dispatcher operation using one distress calling and an operating channel and with semi-duplex supplying and relay stations. The distress calling operation is assured through channel 16 of the navigation and the operational and information tasks are assured through channel 22 of the navigation.

Connected with the system, the development and the building up of an informatics background have also been realised, with the task of providing quick and precise information to the co-operating body on the events occurring along the Danube, and of assuring Internet access for the public concerning information of general interest. This latter possibility is assured by the information web pages operated by the ROE at address: ([www.roe.hu](http://www.roe.hu)).

The aim of the information and distress calling system is:

- to observe the traffic along the whole Hungarian section of the Danube through traffic channel 16 of the navigation designated to distress calls, and in case of need the receipt of the distress calls through a central inspection;
- continuous assurance of the information required by the safe navigation in words and in written form for the participating parties in the international and inland navigation traffic on the Danube;
- the receipt and transmission of distress calls and notices coming from the ships to be found on the Danube (e.g. water pollution, closing of navigable water etc.) to the competent co-operating bodies,
- the ADN ranging, following up the ships transporting dangerous goods, receipt of their registration on arrival prescribed by the shipping company.

The dispatcher service of the DISR takes part in the issue of ADN licences after the working hours of the navigation authority as well, or receives requests of such kind.

In accordance with the experiences gathered so far, the Distress Calling System can promote the work of the licensed pilots and of the other participating bodies to a great extent. The further development of the system should, however, be accomplished for harmonisation with the systems to be found within the EU.

As the first step towards harmonisation, a competition has been elaborated together with several European countries with the title "COMPRIS" in framework program № 5 of the EU, for the further development of the information and distress calling systems for the sake of developing the Hungarian conditions corresponding to the EU-prescriptions and demands.

A further development is required in the field of the radio-technique used, where the requirement for the construction of a further micro-chain has appeared. With the development of the micro-chain the present links of 400 MHz can be replaced, which will result in an important spare frequency, further the installation of the receiving and transmitting stations already in operation at some areas in the European Union. With the realisation of this project a uniform European system can be developed, in which the data of the ships starting from any member country can be transmitted through the system to the countries touched by its route, so that they can prepare themselves for the receipt of the ships and for providing them with as precise information as possible.

The ROE, the VITUKI Rt. and the national public ports of Csepel and Győr-Gönyű are participating in the realisation of the project under the co-ordination of the Institute for Transport Sciences (KTI Rt.) on the Hungarian side.

**Key words:** inland navigation, information systems, EU projects.

**Ref. number:** 110-098-1-0

**Title:** The infrastructure requirements for rendering harmless the rubbish arising alongside the river bank.

**Responsible leader:** Dr. Ernő Pál

**Commissioner:** KöViM

**Consultant of the Commissioner:** Ferenc Nagy

**Responsible leader of the Commissioner:** Dr. István Valkár

**Starting and finishing dates:** 25.05.2000 – 30.03.2001.

**Abstract:** The aim of the research work was to explore the domestic prescriptions and those of used in the EU specifically connected with inland navigation, and which will determine the steps to be taken in relation to the rubbish arising on ships.

Of the practices already introduced in the member countries of the European Union a recommendation will be prepared for the development of a base station network serving for the collection of rubbish and rendering it harmless, in combination with a collection vessel, which is able to receive and partly process the rubbish arising on Hungarian and foreign ships found on the Hungarian section of the Danube.

The gathering and processing (so-called “green”) terminals and services proposed can satisfy the conditions of admission to the EU and, last but not least, they assure a more healthy human environment through the protection of the waterways.

**Key words:** inland navigation, rubbish management, treatment of rubbish.

**Ref. number:** 110-001-1-1

**Title:** Legal harmonisation tasks in connection with the EU guidelines regulating the environmental protection characteristics of the transport means.

**Responsible leader:** Dr. Ernő Pál

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 01.06.2001 – 31.07.2001.

**Abstract:** In the framework of the accomplishment of the legal harmonisation tasks in connection with the EU-guidelines in Hungary, the total legal harmonisation has been realised through the involvement of the newer modification of guideline 88/77/EEC, amended by guideline 1999/96/EEC related to the gaseous and solid particle emission of compression-ignition and gas-engines.

KTI Rt. is the designated testing laboratory for the examination of the emission tests establishing the type-approval of Diesel-engines, and this institute also carried out several operations in the field of gas-engines, including the development of the RÁBA gas-engine in conjunction with a Dutch team. Guideline № 88/77/EEC has been built into KöHÉM order № 6/1990 (IV. 12.) by KTI Rt.

Guideline 88/77/EEC regulates the gaseous and solid particle emission of the compression-ignition engines of heavy trucks. This guideline includes the prescriptions commonly known as the EURO-1 and EURO-2 prescriptions. Further directions have been introduced in the indigenous order during the legal harmonisation related to the checking of the appropriateness of production.

As a result of the so-called Auto Oil Programme of the European Union, a substantial increase in the severity of the prescriptions valid for motor vehicles was decided after 1996.

The title and validity of the directive has also been changed. In addition to Diesel engines (compression-ignition engines), the validity of this directive also now includes the pollution emission of natural gas and liquified gas engines with external ignition.

The methods of measuring have been changed fundamentally. The rules related to the instruments used (first of all concerning the particle measuring device, as well as the rules related to the test-bench and to its control at the ETC tests) and the rules related to the processing of the measured values have all changed.

And finally, the limit-values have also changed from the EURO-1 up to the EURO-5.

The result of the work carried out can be seen in the annex of the research study, together with the materials annexed as further information. Thus, the translation of Directive № 2001/27/EEC (from the point of view of the work only the technical prescriptions to be built in are of importance) is a complete, redacted and revised text containing all the modifications made so far.

The text of the complete structure of the Eastern European Directive touched in the study is built into the draft modification of order 6/1990/KöHÉM, currently under revision.

**Key words:** environmental protection, emission, air pollution, EURO-1 prescriptions, EURO-2 prescriptions, gaseous and solid polluting materials.

**Ref. number:** 110-077-1-9

**Title:** Hungarian obligations in financing the international research project *ALSO DANUBE* (Advanced Logistic Solutions for the Danube Waterway) within the EU 5<sup>th</sup> Framework Programme.

**Responsible leader:** Dr. Ernő Pál

**Commissioner:** KöViM

**Consultant of the Commissioner:** Tamás Marton

**Consultant of the Ministry:** Dr. István Valkár

**Starting and finishing dates:** 08.12.1999 – 30.06.2000.

**Abstract:** The international research project is part of the EU 5<sup>th</sup> Framework Programme. The project deals with a study of the possible share of the Danubian waterway and port services from the traffic and development of the transport corridor VII.

The main objectives of the project are as follows:

- The formation of a planned European concept and system for the organisation, operation and control of the intermodal transport chains, with special regard to inland navigation.
- The development of the management and control system of integrated logistics, related to inland navigation, and the integration of the advanced telematics means and applications.
- The elaboration of a waterway transport operation programme, and demonstration of the ideas within the framework of different scenarios.
- The elaboration of recommendations in the form of guidelines on further applications and implementations for the logistical service providers, the users of these services and the national authorities.
- The improvement of transportation quality by creating improved logistic services.
- Proposals to exploit the strategic potentials of the waterways, with special regard to medium and long distance transportation.

The research has to be carried out in international co-operation up to 2002, and, to date, tasks dealing with the elaboration of the methodology, the growth of the Hungarian economy, the survey of the transport market and that of the environmental problems have been completed.

**Key words:** EU 5<sup>th</sup> Framework Programme, inland navigation, international co-operation, Danube, telecommunication.

**Ref. number:** 110-023-1-1

**Title:** Analysis of the energy utilisation and energy efficiency of traffic; assistance provided to the implementation of energy saving solutions.

**Responsible leader:** Dr. Imre Büki

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Miklós Szoboszlai

**Starting and finishing dates:** 01.05.2001 – 05.12.2001.

**Abstract:** The study serves to promote the Hungarian duties undertaken in the field of transport for the prevention of global climatic changes. Within the framework of the study, overall transport energy statistics have been prepared, also including the monitoring of the specific

values since 1992. In this way, the information basis (utilisation, efficiency analysis) for the grounding of executive decisions is available.

For the preparation of accession to the EU, the harmonisation of the transport policy with the CTP (Common Transport Policy) of the EU is desirable. A task of outstanding importance during the period until 2004 is to decrease dependence on the increased energy demands. This involves the spreading of innovative energy saving solutions and directly promoting the improvement of energy efficiency. This is the aim of the so-called OPET (Organisations for Promotion of Energy Technologies) activity, and also receives 50% support from the EU (15.000 ECU). The work is harmonised with the energy saving strategy and programme launched by Government *Decree 1107/1999.(X.8.)* and provides for the promotion of the programme-related KöViM tasks.

In the transport sector, data available on transport outputs and specific energy consumption were systematised for the period 1980-2000, and control tests were carried out using the correlation of the data. Time series tests were also made for the same period. The study presents the developments to be expected by 2015 on the basis of the 1999 revision of the Hungarian transport policy.

The study presents the European Commission's transport policy valid up to 2010 (White Paper), also available on the Internet, as well as the Community's action plan for the improvement of the energy supply strategy (Green Paper) and energy efficiency.

**Key words:** energy management, energy utilisation, specific energy utilisation.

**Ref. number:** 110-003-2-0

**Title:** Dictionary of road terms (PIARC Dictionary).

**Responsible leader:** Mrs. Gyuláné Flórián

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Dr. András Gulyás

**Starting and finishing dates:** 15.01.2001 – 15.11.2001.

**Abstract:** The document is the seventh edition of the technical dictionary of road terms and the up-dated version of the sixth edition elaborated by the PIARC Commission on Terminology. The publication is the amended version of the originally bilingual (English and French) glossary and the compilation of terms also containing the Hungarian version.

**Key words:** technical dictionary, terminology, PIARC.

**Ref. number:** 110-007-2-0

**Title:** PMS – from theory to practice

**Responsible leader:** Mrs. Gyuláné Flórián

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Dr. András Gulyás

**Starting and finishing dates:** 15.01.2001 – 15.11.2001.

**Abstract:** In 2000, the first European PMS conference was held in Hungary. The booklet contains those Hungarian papers which had been prepared on the subject in Hungary, and, for which the greatest interest had been shown. These are the following: Relation between PMS and the decision-makers, case studies and real solutions of tasks, practical applications, surveying the PMS of the different countries, practical issues with special regard to the organisation of management and the costs of road use.

**Key words:** PMS, conference proceedings.

**Ref. number:** 110-012-2-1

**Title:** Assistance provided to victims of road accidents and migration diseases.

**Responsible leader:** Mrs. Gyuláné Flórián

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** István Szarka

**Starting and finishing dates:** 15.05.2001 – 15.11.2001.

**Abstract:** A comprehensive road safety policy consists of two parts: prevention and assistance provided to victims. The number of people killed or injured as a result of road accidents is influenced by different factors, which shows approximately the life-saving effect of the assistance given subsequent to the accident. Recently the number of journeys has increased considerably. Migration (population movement with a view to permanent or provisional change of place), in addition to the spreading of different infections, may have an unfavourable influence on both the number and severity of road accidents. The spreading of migration implies an international epidemiological crisis. The epidemiological and accident exposure declared some years ago by the WHO, requires a global answer to the prevention of epidemics and accidents, and therefore, international collaboration is needed.

**Key words:** accident, emergency, migration.

**Ref. number:** 110-020-2-1

**Title:** Supplying the road state and traffic related data to the road management.

**Responsible leader:** Mrs. Gyuláné Flórián

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Dr. András Gulyás

**Starting and finishing dates:** 08.03.2001 – 15.11.2001.

**Abstract:** The length of the Hungarian public roads is 135.000 km. Of this, 30.000 km is the length of the roads in state management, which carry 65% of the total traffic. One of the pavement management systems input involves data concerning the road surface, the road condition, the bearing capacity and traffic. The existing and future road network can be evaluated through such characteristics as: the bearing capacity of the pavement structure, unevenness presenting the surface state of the road pavement, as well as rutting, skid resistance and surface defects. Higher quality information helps the efficient maintenance and operation of roads and bridges, giving points of support for those involved in maintenance and operation.

**Key words:** rut, road surface characteristics.

**Ref. number:** 110-014-2-1

**Title:** A proposal to adapt the model of the system of container management implemented at *Budapest-Józsefváros* Combi-terminal to other terminals.

**Responsible leader:** László Valter

**Commissioner:** Győr-Sopron-Ebenfurti Vasút Rt.

**Consultant of the Commissioner:** Károly Józsa

**Responsible leader of the Commissioner:** Dr. Attila Csaba

**Starting and finishing dates:** 08.05.2001 – 14.12.2001.

**Abstract:** Having evaluated the radio frequency data collecting and transmitting units previously implemented and actually operating, as well as the experience related to the operation of their attached computer systems, the competent experts of the ministry were of the opinion that the system is suitable for further adaptation. Following the surveys, at the proposal of the *MÁV Kombiterminál Kft.*, the container terminals of *Szombathely*, *Szeged* and *Pécs* were designated as the next sites for the development programme. On the basis of the demands, a proposal has been submitted for the building-up of the system; the operation conditions were determined and the preliminary operation started. Following the phase of data collection, the operation company made a proposal for the improvement of the system. As long as the number of containers increases to a great extent, the expansion of the hardware or in other cases, the development of the software may become necessary. In the optimal case, both possibilities can be realised from own financial resources in the near future.

**Key words:** container, container-terminal, combined transport, telematics.

**Ref. number:** 110-017-2-1

**Title:** Proposal for further development of the information system of the *Sopron* Logistics Centre.

**Responsible leader:** László Valter

**Commissioner:** On behalf of the *MÁV Rt. Beruházáslebonyolító Hivatal Budapesti Beruházáslebonyolító Osztály*

**Consultant of the Commissioner:** Károly Józsa

**Responsible leader of the Commissioner:** Dr. Attila Csaba

**Starting and finishing dates:** 08.05.2001 – 14.12.2001.

**Abstract:** In the course of the elaboration of the topic, the following tasks had to be implemented: the development aspects of the information model, and the information supply and development trend of the combi-terminal and logistics centre had to be specified and studied. In 2000, the strategy report addressed to this subject dealt in detail with the development aspects of the information model, and also offered, according to client's requirements, a feasibility proposal in the chapter on the conclusions and suggestions for the different solutions of the warehouse-logistics and information system. In 2001, in this chapter, the building-up and operation phases of a real warehouse-logistics system (RAMIR) were presented. Furthermore, the basis of the hardware of the system has been presented; the radio-frequency units, TEKLOGIX, were already partially known or completely new.

**Key words:** logistics, combined transport, informatics, warehouse-logistics.

**Ref. number:** 110-016-2-1

**Title:** A proposal for the establishment of the information systems needed for a concerted operation of the industrial parks and logistics centres.

**Responsible leader:** László Valter

**Commissioner:** On behalf of the *MÁV Rt. Beruházáslebonyolító Hivatal Budapesti Beruházáslebonyolító Osztály*

**Consultant of the Commissioner:** Viktor Cséti

**Starting and finishing dates:** 08.05.2001 – 14.12.2001.

**Abstract:** Logistics centres are the supplying and distributing headquarters operated on a regional level and providing large scale services. Beyond transport, loading and storing (RST), and the directly related activities – through a physical and information network – the centres undertake and carry out all those tasks which are necessary for the smooth realisation of the processes of purchase, production and marketing. In the logistics centres, the different transport, shipping, logistics and other companies, collaborate at a company seat which is advantageously situated with respect to its traffic accessibility. Infrastructure possibilities also ensure the settlement in the same place of a great number of small and medium-sized enterprises engaged in logistics services. Logistics centres also make it possible for the small enterprises without a structurally independent organisation to make use of the benefits of logistics. From an organisational point of view, the multi-centre system – partly – consists of different firms, and information management is one of the most important internal fields of the harmonised operation. This way, information becomes the most essential resource of the logistics service centre, its handling being of primary importance from the point of view of the whole system. It is the aim of the enterprises working together in the logistics centre to provide such complex services in which the different enterprises participate according to the competency of their firms, implementing vertical and horizontal co-operation amongst each other. For the service user (consumer), the logistics chain (with complex logistics service) is the product itself. This logistics chain consists of central organisational resources and capacities necessary for the implementation of the given task, and may even cease as the task is completed.

**Key words:** combined transport, combi-terminal, informatics, virtual information system.

**Ref. number:** 110-008-1-1

**Title:** Adoption of *Resolution 1753/2000/EC* within the framework of the law harmonisation tasks related to the EU directives concerning the environmental characteristics of the means of transport.

**Responsible leaders:** László Valter

**Commissioner:** KöViM Környezetvédelmi önálló osztály

**Consultant of the Commissioner:** Dr. Miklós Szoboszlay

**Starting and finishing dates:** 01.06.2001 – 31.07.2001.

**Abstract:** *Resolution 1753/2000/EC* has been adopted for the reduction of the harmful effects of transport. This provision also includes essential monitoring requirements, the mode of data collection and processing, and the realisation of the regulations of the European Parliament and Commission on the monitoring of the average CO<sub>2</sub> emissions of new passenger cars.

Equipment for the measurement of fuel consumption and CO<sub>2</sub> emissions of passenger cars is in the possession of KTI Rt., and these kinds of measurements are carried on continuously. Informal publications dealing with fuel consumption and emissions of passenger cars have been issued for many years under the leadership of KöViM. KTI Rt. adopted in *KöHÉM Order 6/1990.(IV.12.) Directive 80/1268/ECC* as amended by *Directive 1999/100/EC*.

The *UN Framework Agreement* on climatic changes, approved in 1992 in Rio, set as an objective the moderation of the emission gases with green house effect. The *Kyoto Protocol* approved in 1997 and annexed to the Agreement, envisaged already real reduction of CO<sub>2</sub> emissions. The EU undertook an 8% decrease in the greenhouse gases for the period 2008-2012 in comparison with the 1990 values for its 15 member states.

Transport plays a decisive role in the emission of greenhouse gases, especially in CO<sub>2</sub> emissions. Consequently, engagements of Kyoto can hardly be imagined without the implementation of the provisions in the field of transport.

Of the different modes of transport, the road sector is the main energy consumer, and within this category, passenger cars and heavy goods vehicles contribute to the emission of gases with a greenhouse effect in almost the same proportions.

Reviewing the possibility of CO<sub>2</sub> emission reductions in the EU, passenger cars were considered first, primarily because in this case, fewer economic consequences are concerned, and furthermore, this category can be better controlled from the aspects of measurements than heavy goods vehicles. The choice of passenger cars has also been justified by the fact that most heavy goods vehicles are equipped with diesel engines, and this category provides fewer possibilities for the radical reduction of fuel consumption.

In accordance with the resolution, the data of motor vehicles newly put into traffic are supposed to produce the following statistics:

- The total number of new passenger cars and their average, specific CO<sub>2</sub> emissions have to be determined by fuel types (petrol, diesel, PB, CNG);
- The breakdown of the specified CO<sub>2</sub> emission of new passenger cars has to be determined by fuel types;
- The breakdown of the CO<sub>2</sub> emission and performance of new passenger cars by specified maximum effective performance categories have to be determined by fuel types;
- The breakdown of the CO<sub>2</sub> emission and displacement of new passenger cars by specified displacement categories has to be determined by fuel types.

According to the proposal, the provisions of the directive can be included into the relevant parts of *KöHÉM Order 5/1990.(IV.12.)* on the inspection of road vehicles. Basically, it is proposed that the Chief Transport Inspectorate (KFF) will be made responsible for the monitoring of CO<sub>2</sub> emissions, while the regional transport inspectorates – in a form and with a method specified by the KFF – should collect and preliminarily process the different data.

**Key words:** European Parliament, Kyoto Protocol, environmental law harmonisation, EU directive, road vehicles, engine performance, greenhouse effect, CO<sub>2</sub> emission, CO emission.

### *Research Director*

**Ref. number:** 101-001-1-0

**Title:** Generalisation of the deterioration features of trial sections for road management purposes.

**Responsible leader:** Dr. habil. László Gáspár

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** István Szarka

**Starting and finishing dates:** 01.07.2000 – 30.10.2001.

**Abstract:** Some 60 trial sections of the Hungarian state highway network, each of 500 m in length, have been selected and monitored each year since 1991. Unevenness (roughness), rut depth, pavement structure bearing capacity and macro and micro texture have been measured, while surface condition (defects) has been characterised visually.

The results of eleven-year trial section monitoring have made it possible to create more and more accurate highway performance models for the condition parameters mentioned above. Linear and exponential models have been developed as a function of pavement age or traffic volume. 14 road section types have been differentiated.

The actual effect of various rehabilitation techniques on improved conditions were evaluated and the deterioration features of rehabilitated sections compared to those before rehabilitation.

**Key words:** pavement condition evaluation, trial road section, pavement deterioration, pavement performance model, pavement management system.

**Ref. number:** 101-002-2-1

**Title:** Technical-economic analysis of rut depth repairs.

**Responsible leader:** Dr. habil. László Gáspár

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Dr. Tibor Boromisza

**Starting and finishing dates:** 26.04.2001 – 20.06.2001.

**Abstract:** The repair of actual ruts has become a more and more important renovation technique in Hungarian practice recently. Several techniques are applied. Their technical-economic analysis relied on the effect of pavement interventions of various condition parameters, their unit costs and several-year changing of road user costs.

**Key words:** rutting, rehabilitation, technical-economic analysis, road user costs.

**Ref. number:** 101-003-2-1

**Title:** Contribution to the Hungarian adaptation of the HDM-IV model.

**Responsible leader:** Dr. habil. László Gáspár

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Zoltán Szabó

**Starting and finishing dates:** 15.02.2001 – 25.05.2001.

**Abstract:** Financed by several international financial institutions, the HDM-IV road development-maintenance model has recently been completed. Its Hungarian adaptation was deemed necessary.

In this complex work the Institute's task was to make a proposal for the modifying deterioration factors characteristic of the domestic circumstances based on actual highway pavement



performance information. Several former long-term monitoring data of KTI-institute were utilized here.

**Key words:** computer model, HDM IV, road condition data, time data series.

### *Division of Roads and Bridges*

**Ref. number:** 242-177-1-0

**Title:** Density measuring methods in connection with CEN and SHRP.

**Responsible leader:** Ms. Ágnes Görgényi

**Contributor:** IMI Kft.

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Dr. Sándor Tóth

**Starting and finishing dates:** 01.09.2000 – 31.10.2001.

**Abstract:** An important material characteristic of asphalt mixtures, the residual void content, requires the determination of the density of asphalt mixtures. The ASTM standards connected with CEN and SHRP specifications specify different methods (without the use of solvents) from the earlier standardised testing methods.

For environmental and health protection considerations – on behalf of ÁKMI Ltd – KTI Rt (Institute for Transport Sciences Ltd) carried out a research project in 1997 and 1998 on the replacement of organic solvents in asphalt laboratory practice. As a result of this project, it was determined that the density of asphalt mixtures can also be measured with a good reproducibility using the wet, metal pycnometer method described in an ASTM standard, as justified by the common tests of KTI Ltd, IMI Ltd and BAUTESZT Ltd.

EN specifies three test types for the determination of density as a function of material types: the pycnometer (wet method with organic solvent) method, the hydrostatic method and the calculation method. The EN wet method with organic solvent is the same as the ASTM variant investigated by KTI Ltd..

As a result of the research work

- the draft of the technical guidelines on the wet asphalt density method with metal pycnometer, which is in accordance with the EN standard under publication, was elaborated. After a wide survey of professional opinion, the draft was given to MAUT (Hungarian Road Society) for publication.
- the wet testing method of aggregate density with metal pycnometer which will be utilized for the calculation determination method in EN during the investigation, using rock types and fractions typical in asphalt road construction was developed. The asphalt density values were calculated and their effect on the void content of asphalt mixtures tested,
- comparison tests were made between the valid standard method and the wet method with pycnometer using several asphalt types. The effect of these results on the void content of asphalt mixtures was investigated,
- a round robin test was organised for three laboratories on the direct wet asphalt density measuring method with pycnometer. Based on its results, the repeatability and the reproducibility of the measuring test were tested,
- connected with the density measurements, the porosities of the most widely used rock types were determined and the effect on the asphalt density and void content evaluated.

**Key words:** measuring methods, asphalt density, asphalt mixtures.

**Ref. number:** 242-182-2-1

**Title:** Monitoring of experimental sections built in 1998 and 1999.

**Responsible leader:** Ms. Ágnes Görgényi

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** András Rétháti

**Starting and finishing dates:** 02.05.2001 – 30.11.2001.

**Abstract:** Experimental sections have been built on the state highway network since 1998. In order to evaluate the practical suitability of the new products or technical solutions tested on the state highway network, it is necessary to monitor them for at least 3 years following their construction in order to evaluate their performance under traffic.

Taking into consideration the aims of experiments to determine the level of achievement of the original aims, KTI has developed an evaluation system based on several tests. The system comprises the following elements:

- visual detailed condition survey of test sections (cracks, ravelling, potholes, ruts, drainage system and shoulder condition), taking photographs of the experiments and the eventual typical defects,
- measurements to evaluate the level of success of the original aims (e.g. resistance to deformation, bearing capacity, texture) on trial and reference sections,
- evaluation of measuring results by comparison with those obtained on trial and reference sections.

Five experimental sections were introduced in 1998, and thirty-six in 1999. Of the sections built in 1998, one was related to traffic engineering and four connected with road pavement structures. The distribution of the thirty-six experimental projects constructed in 1999 was as follows: seven related to traffic engineering, three to bridge construction, twenty-three to pavement structures and three other experiments connected with roads. Of the traffic engineering experiments, three were connected to studs, two to road marking paints, one to acoustic road marking and one to traffic islands. In the bridge engineering experiments two bridge-insulations and one concrete repair and protection materials were tested. The pavement structure experiments consisted of two main groups: development of pavements resistant to deformation on roads carrying a high volume of traffic and profile correction of low volume roads. On the roads carrying a high volume of traffic, three experiments were connected to bus stop pavements resistant to deformation and ten to the development of asphalt pavement resistant to deformation on primary main roads. Seven experimental sections were built on low volume roads, three of them using several variations of GRUNDMIX technique. One experiment was connected with the strengthening of pavement structure using a strengthening textile, one with a profile repair using cutback asphalt pavement, one with natural bituminous sand, and one with patching and large-area pavement repair. Other pavement structure experiments included the stress absorbing of a cement-stabilised gravel layer mixed in plant, construction of coloured asphalt on footpath and cycle paths, and the testing of a two-component cold joint sealing compound. The protection of rock slopes using two techniques can be considered as „other experiments”.

The report contains the results of the visual inspection of experimental sections presented by photographs and their evaluation based on measuring results.

**Key words:** road experiment, experimental road section, monitoring.

**Ref. number:** 242-183-2-1

**Title:** Monitoring of experimental sections built in 2000.

**Responsible leader:** Ms. Ágnes Görgényi

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** András Rétháti

**Starting and finishing dates:** 02.05.2001 – 30.11.2001.

**Abstract:** Twenty-six experimental sections were built on the national highway network in 2000. Of these, three were related to traffic engineering, one to bridge construction, twenty to pavement structure and 2 other experiments. Those related to traffic engineering consisted of stud experiments and a dynamic traffic engineering trial. The pavement structure element can be divided into two main groups: development of pavements resistant to deformation on roads

carrying a high volume of traffic and profile correction of low volume roads. On roads carrying a high volume of traffic, two trials were connected to the construction of turning lane pavements resistant to deformation, and three to the development of primary main road asphalt pavements resistant to deformation. Other trials were carried out on low volume roads, including surface dressing, asphalt layers of various composition, recycling of asphalt granulates, in-situ cement stabilisation using remix technique, fly ash stabilisation. The other experiments connected with road pavement structures included, among others, rough pavements, constructed using SOIL 2000 technique, for the removal of mud from the wheels of vehicles, strengthening of peat soils using micro piles, and the sealing of cracks in asphalt pavements.

The experimental sections were 1-year old in 2001. Taking into consideration the aims of the experiment, KTI has developed an evaluation system based on several measurements to determine the level of achievement of the original aims. The report contains the visual inspection results of experimental sections and the measuring results with their evaluation.

**Key words:** road experiment, experimental road section, monitoring.

**Ref. number:** 245-003-2-0

**Title:** Revealing of the possibilities for the application of composite pavement structures in Hungary.

**Responsible leader:** Mrs. Dr. Katalin Karsainé Lukács

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Viktor Duma

**Starting and finishing dates:** 31.08.2000 – 15.06.2001.

**Abstract:** The main aim of the research was to reveal the areas for the application of composite pavement structures in Hungary, based on international literature and study tour experiments. The composite pavement structure is characterised by the simultaneous use of asphalt and concrete layers which have basically different properties. It is obvious that this pavement structure type combines the high bearing capacity and increased resistance to deformation of cement concrete pavements with the well-known favourable features of asphalt courses. In this way, they can also play an important role – similarly to the world-wide tendency – in the Hungarian roads carrying a high volume of traffic, especially taking into account the tasks connected to our joining the European Union.

**Key words:** composite pavement structure, high volume traffic, joining the European Union.

**Ref. number:** 245-001-1-1

**Title:** Follow-up of the long-term monitoring of experimental cement concrete pavements in order to register their deterioration process.

**Responsible leader:** Ms. Katalin Lukács

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Ms. Zsuzsa Szirbek.

**Starting and finishing dates:** 21.07.2000 – 31.05.2001.

**Abstract:** In 1999, three cement concrete trial sections using various techniques and an asphalt control section were built with the active participation of KTI. The total length of the experimental sections of road № 7538 amounted to 2000 m. The monitoring of sections started immediately upon completion. The main aim of the research was to continue monitoring these sections.

The short and medium term monitoring of the three experimental sections with cement concrete pavement allow partly to receive information on the actual deterioration process, and partly to evaluate the costs of maintenance and rehabilitation. Another important result of the monitoring process is the possibility to compare the two pavement structure types utilising the condition evaluation data of the asphalt control section and to assess the long-term consequences on the national economy.

**Key words:** experimental road section, road condition evaluation, cement concrete pavement structure, costs of maintenance and rehabilitation, pavement deterioration.

**Ref.number:** 243-001-2-1

**Title:** Guide to asphalt technology for MOL road bitumens.

**Responsible leader:** Ms. Erzsébet Kuna

**Commissioner:** MOL Ltd.

**Consultant of the Commissioner:** Dr. Erika Fantó.

**Starting and finishing dates:** 15.02.2001 – 30.06.2001.

**Abstract:** The Commercial Division of MOL Ltd commissioned the Institute for Transport Sciences Ltd to work out a guide to asphalt technology for MOL road bitumens.

The tasks to be carried out were as follows: presentation of asphalt technology of MOL bitumen products for road bitumens, modified bitumens (for so-called hot techniques), as well as unmodified and modified asphalt emulsions, cutback bitumens, further special cutback bitumens and bitumen emulsions produced from cutback and road bitumens.

The guide to asphalt technology comprises:

- general characterisation,
- binders to be applied,
- aggregates to be applied,
- additives (where available),
- execution,
- application areas.

The technological guide is divided into various MOL bitumen types (HBA-A 150/300; HB-R 150/300; B50/70; B70/100, B160/200; PmB-A 140/230; PmB-B80/150; PmB-B 90/120). The techniques are presented in the same classification.

**Key words:** road bitumen, bitumen emulsion, cutback bitumen, guide to asphalt technology.

**Ref.number:** 243-004-2-1

**Title:** Preparatory works for the adaptation of the quality requirements of cationic bitumen emulsions.

**Responsible leader:** Ms. Erzsébet Kuna

**Commissioner:** ÁKMI Kht.

**Consultant of the commissioner:** Dr. Sándor Tóth

**Starting and finishing dates:** 02.05.2001 – 15.10.2001.

**Abstract:** The aim of the research is the facilitation of the implementation in Hungary of the specification for the quality requirements of cationic bitumen emulsions which were established by Working Group CEN/TC 336/WG2 of European Union member countries. When adapting CEN specifications in Hungary, several limit values of the quality parameters in actual local specifications have to be modified in order to ensure a sufficiently wide range for the consideration of local specialities. The reason for the present theme was that there were no Hungarian equivalents to some 42 % of the cationic bitumen emulsion test methods in accordance with CEN, while a further 28 % differ in testing principles.

The following activities were performed in the theme:

- translation of the CEN product standard to Hungarian,
- comparison of the quality parameter thresholds of the CEN product standard with local limit values,
- comparison of the Hungarian and CEN test methods which play an important role in developing these thresholds,
- if possible, the inclusion of valid Hungarian limit values into the relevant CEN specification and giving new names to local products in accordance with CEN,
- revealing the quality parameters missing in Hungary and those which need to be changed,

- classification of Hungarian cationic bitumen emulsion products, emphasising the thresholds to be developed where a preliminary test series has to be carried out using CEN test methods before establishing the thresholds.

**Key words:** cationic bitumen emulsion, CEN standard, standardisation, quality requirements.

### *TEM Bureau*

**Ref. number:** 130-001-2-1

**Title:** Implementation of, and co-operation in the activities related to the Trans-European North-South Motorway (TEM) Project.

**Responsible leader:** Dr. Boldizsár Vásárhelyi

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Tamás Nagy

**Starting and finishing dates:** 01.01.2001 – 30.11.2001.

**Abstract:** The aim of the study was the harmonisation of the activities of the TEM planning and construction, carried out independently by each member country, and the exploration of the financing possibilities. Participation is beneficial to the transport and economy of all countries, because it also helps the main traffic lines of the TEM region to join collectively the EU road network (major contribution to *TINA* project).

Within the framework of the theme, co-ordination of research required from the Hungarian party is continuing, in accordance with the principles of the current VI<sup>th</sup> phase of the activities.

**Key words:** TEM, international co-operation, motorway planning, road construction, Pan-European traffic corridors.

**Ref. number:** 130-002-2-1

**Title:** Co-ordination of several Hungarian activities to be carried out in the Inland Transport Committee, its subordinated bodies of the United Nations Economic Commission for Europe and implementation of some tasks pertaining to WP1 (road traffic safety).

**Responsible leader:** Dr. Boldizsár Vásárhelyi

**Contributor:** Ms. Jenőné Katona

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Tamás Nagy

**Starting and finishing dates:** 01.01.2001 – 30.11.2001.

**Abstract:** The Institute for Transport Sciences Ltd and its predecessors have continuously participated for more than twenty years in Hungary's contributions to the activities of the *Inland Transport Committee of the United Nations Economic Commission for Europe*. Co-ordinating and preparatory works, as well as expert knowledge are provided, and, as a result, the Institute for Transport Sciences Ltd serves as an interface between the Hungarian road sector and the most competent European organisation for the evaluation and adaptation of the results of the overall progress. The importance of this work is greatly enhanced by environmental and safety demands. One important event was the Seminar on "Human Aspects of Road Safety" (Budapest, August 2001) as a follow-up to the *3rd European Traffic Safety Week* (May 2000).

**Key words:** traffic safety, transport policy, international co-operation, UNECE.

**Ref. number:** 130-013-2-1

**Title:** Implementation of, and co-operation in the activities related to the Road and Combined Transport Research Programme of the OECD-RTR.

**Responsible leader:** Dr. Boldizsár Vásárhelyi

**Contributor:** Gábor Albert

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** András Rétháti

**Starting and finishing dates:** 01.01.2001 – 30.11.2001.

**Abstract:** Hungary has been participating with full membership in OECD programmes since the spring of 1996, and, as a consequence, in its „RTR” (*Road and Combined Transport Research*) Programme. The work which has been carried out here for 30 years is highly co-operative, disciplined and of a high level, also providing, in harmony with the other professional international organisations of the world, a valuable outlook to their activities. Hungarian contributions were made in several topics (databases, environment, technology transfer, etc.).

**Key words:** OECD, RTR programme, road transport research, international co-operation.



*Division of Traffic Safety and Traffic Engineering*

**Ref. number:** 211-071-1-1/5.5.

**Title:** Analysis of the demerit point system, taking into consideration transport inspection and police experiences.

**Responsible leader:** Dr. Péter Holló

**Contributors:** Dr. Domonkos Jankó; Mrs. Jánosné Papp; Tamás Siska; Miklós Gábor.

**Commissioner:** KöViM Gépjárműközlekedési Főosztály

**Consultant of the Commissioner:** Géza Kározy

**Starting and finishing dates:** 06.07.2001 – 31.10.2001.

**Abstract:** In the framework of the research, partly the efficiency analysis of the demerit point system was carried out on the basis of the available data, and partly the proposals were elaborated for the revision, and for the efficient establishment of the point system in accordance with recent international and national experiences. The current point system is completely inefficient; it has no real withholding force against those breaking the rules. Following the introduction of the system, contrary to many other countries, the road accident situation did not improve considerably, but instead the trend for improvement experienced over many years not only came to a standstill, but deteriorated. The severe deficiency is that no distinction is drawn between the severity and risk level of offences, although this is a basic criterion and would also be a clear fundamental requirement of the National Traffic Safety Programme -.

**Key words:** demerit point system, traffic behaviour, road accident.

**Ref. number:** 211-071-1-1/11.2

**Title:** Evaluation of the implementation of the National Traffic Safety Programme; a proposal for a planned continuation of the traffic safety activity.

**Responsible leader:** Dr. Péter Holló

**Contributors:** Dr. Domonkos Jankó; Mrs. Jánosné Papp; Tamás Siska.

**Commissioner:** KöViM Gépjárműközlekedési Főosztály

**Consultant of the Commissioner:** Géza Kározy

**Starting and finishing dates:** 06.07.2001 – 15.12.2001.

**Abstract:** Experiences – results and deficiencies – of the National Traffic Safety Programme were overviewed and evaluated in the following stages:

1. Elaboration of the methodological aspects for the evaluation of the National Traffic Safety Programme (NTSP).
2. Collection of the reports dealing with the measures achieved, actions, theoretical and practical activities (“positive examples”) of the NTSP, with special regard to the formation of traffic behaviour.
3. Exploration of the reasons why some domains of the objectives remained either partially or fully unrealised, especially from the aspects of the “human factor”.

On the basis of international experiences and of the recommendations of the conferences held on the relevant subject, a proposal was made for the elaboration of provisions relating to the further successful development of the programme.

**Key words:** accident prevention, National Traffic Safety Programme.

**Ref. number:** 211-071-1-1/4.1.

**Title:** Determination of the road accident loss caused to the national economy by the use of Euro-conform methods.

**Responsible leader:** Dr. Péter Holló  
**Contributors:** Dr. József Reimann; Dr. Domonkos Jankó.  
**Commissioner:** KöViM Gépjárműközlekedési Főosztály  
**Consultant of the Commissioner:** Géza Kározy  
**Starting and finishing dates:** 06.07.2001 – 15.12.2001.

**Abstract:** Statistical value of human life is an economic term that is fundamentally important from the aspects of quantifying the road accident loss and of the optimally efficient use of the possible financial means of accident prevention. Two procedures are known to be used in the process of its determination: the methods of human capital and of willingness to pay. Until recently, only the first method had been used in Hungary ; for the first time, an attempt is being made, within the framework of the present study, to test the second procedure in road safety. Accordingly, on the basis of foreign and national experiences gathered in other fields, but using the same methods, not only has the preparation been undertaken, and later the implementation and evaluation of a survey carried out in the form of questionnaires, but also the meta-analysis of the foreign findings obtained up until now.

**Key words:** willingness to pay, road accident loss, meta-analysis.

**Ref. number:** 211-066-2-0

**Title:** “Before” and “after” analyses of the road safety effects and the complex economic efficiency analysis of the meteorological signalling system (UTMET).

**Responsible leader:** Dr. Péter Holló  
**Contributors:** Dr. József Reimann; Dr. Dezső Rósa; Miklós Gábor.  
**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Zoltán Vályi

**Consultant of the Ministry:** Dr. Péter Lányi

**Starting and finishing dates:** 10.16.2000 – 15.12.2001.

**Abstract:** The meteorological signalling system which has been installed along the national road network is expected to contribute primarily to a more successful prevention of accidents involving sliding and running off the road (single-vehicle accidents); however, the operation of the system can also influence advantageously the quantity of material used for de-icing, as well as the amount of expenditure assigned to road surveillance activities. Research has two purposes: on the one hand, the objective is to investigate the meteorological signalling system from the aspect of whether or not its operation really does improve road safety significantly, and, on the other hand, a complex efficiency analysis of the whole investment in the field of telematics. In the two interim reports prepared until now, the evaluating analysis is given concerning the relevant international literature explored in connection with the application of the system, the background of the meteorological research required for the study of the time series of several years duration (winter indices, categorisation, registration, etc. of the weather and road conditions), as well as the results of a survey by questionnaires related to winter maintenance of the Hungarian road network.

**Key words:** meteorological signalling system, winter road maintenance, telematics, anti-skidding.

**Ref. number:** 211-038-2-0

**Title:** Revision of traffic types with respect to traffic characteristics.

**Responsible leader:** Ms. Mária Cseffalvay  
**Commissioner:** ÁKMI Kht.

**Consultants of the Commissioner:** Dr. András Gulyás; Gábor Thurzó.

**Starting and finishing dates:** 01.09.2000 – 30.04.2001.

**Abstract:** The main objective of the traffic census carried out on the national public roads is to determine the yearly average daily traffic (ADT) of a specified road section. According to the basic principle of traffic counting, the required characteristics of the resulting basic data are the

average annual daily traffic and the characteristics of the daily, weekly and yearly (monthly) traffic flows.

The essence of the applied traffic census method is the capability of an accurate determination of the value of the average daily traffic, also in cases of relatively few data, with the help of the factors reflecting the characteristics of the traffic fluctuations.

For the last time, characteristic factors were modelled on the basis of the 1995 traffic census data. Since that period the travelling habits have changed to a great extent (construction of concession motorway sections, introduction of summertime heavy traffic restrictions, etc.). Therefore, a re-analysis of the traffic characteristics, and a revision of the foregoing traffic types was deemed appropriate.

In the framework of the study, on the basis of the data of the previous years (1996, 1997, 1998, 1999 and preliminary data of the year 2000), recorded manually and with the help of various automatic equipment (counting pieces, classifying vehicles, weighing axles), the characteristics of the traffic flow and the new (revised) traffic types were determined with group analysing tests.

**Key words:** traffic count, traffic type.

**Ref. number:** 211-068-2-1

**Title:** Reprogramming of the automatic traffic counting equipment and the control of vehicle categorisation and speed measurement.

**Responsible leader:** Ms. Mária Cseffalvay

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Gábor Thurzó

**Starting and finishing dates:** 15.05.2001 – 30.11.2001.

**Abstract:** The recognition of vehicles by type and their classification into different categories according to the algorithm and vehicle classification tables specified by the manufacturers is carried out with the help of the vehicle categorising equipment (HESTIA, ADR 2000, RAKTEL 8000 and QLD-6CX) used in the cross sectional traffic census implemented on the national public roads.

Vehicle categories specified in the Technical Regulation on roads, ÚT 2-1.109:200: “Determination of the cross sectional traffic of national public roads”, are different from the vehicle classes currently used by the automatic equipment. Different vehicle classifications made the revision of the recognition principles of the automatic vehicle categorising equipment necessary, as well as a solution for the classification of Hungarian vehicles in a way which is as unambiguous as possible. Evaluations carried out by different types of instruments and the proposals for modifications were prepared on the basis of video recordings made in the framework of the study.

**Key words:** traffic count, automatic traffic counter, vehicle categorisation.

**Ref. number:** 213-046-1-0

**Title:** Danger scale of road-railway crossings for the year 2000.

**Responsible leader:** Tibor Mocsári

**Commissioner:** KöViM Vasúti Főosztály

**Consultant of the Ministry:** Károly Dániel

**Starting and finishing dates:** 15. 12. 2000 – 15. 05. 2001

**Abstract:** The study presents the point system used in the elaboration of the scale of danger at railway crossings, or the level of danger itself. Proposals on accident prevention are forwarded and effects of the previous interventions evaluated, after describing the traffic safety situation prevailing at road-railway crossings.

**Key words:** road-railway crossing, traffic safety.

**Ref. number:** 211-065-1-0/3.1

**Title:** Danger scale of crossroads on the public road network

**Responsible leaders:** Ms. Erzsébet Hóz; Tibor Mocsári.

**Commissioner:** KöViM Gépjárműközlekedési Főosztály

**Consultant of the Ministry:** Dr. Péter Lányi

**Starting and finishing dates:** 09. 2000 – 04. 2001.

**Abstract:** Cost-benefit analysis was carried out for crossroads (road sections), where the local road authorities suggested an increase in the safety situation by the introduction of traffic safety measures. The study also contains the site plan of these crossroads showing the situation “before and after”.

**Key words:** danger scale, black spots.

**Ref. number:** 213-043-1-0

**Title:** Evaluation of road signs for better visibility of black spots in GRSP.

**Responsible leader:** Tibor Mocsári

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Péter Vasi

**Starting and finishing dates:** 15. 09. 2000 – 15. 12. 2001.

**Abstract:** During the Global Road Safety Partnership (GRSP) Round Table Meeting on May 4, 2000 in Budapest, GRSP activities in Hungary were discussed and proposed as potential projects. One of the 13 potential projects decided on at that meeting is the following (in Group B: Improving safety by improving the visibility at night): Project 4: Improving the visibility and safety at black spots. The project leader is 3M Hungaria Ltd. Terms of reference: Demonstrating the effects of better road alignment, visibility at night and traffic signs at a number of existing black spots. Appropriate markings and signs will be put in place by 3M.

The Institute for Transport Sciences Ltd., road administration and police indicate black spots where night visibility is the main problem.

The topic of this project is the evaluation of these black spots by a “before – after” study. Driving speeds are measured at 3 places, driving behaviour is observed and evaluated and traffic conflict technique is used to identify the effects of these special road markings and signs.

**Key words:** black spots, measuring speed, GRSP.

*TRANSORG, Division of Transport Organisation Development and Logistics*

**Ref. number:** 220-015-2-1

**Title:** A complex study of the public bus transport system of the county-town *Nyíregyháza*, and a proposal for its rationalisation.

**Responsible leader:** Dr János Berényi

**Contributor:** Mrs. Endréne Trepper

**Commissioners:** Szabolcs Volán Rt., Nyíregyháza City Municipality

**Consultants of the Commissioners:** Dr. Péter Huba, Szabolcs Volán Rt.; Gábor Zolnai, Nyíregyháza City Municipality.

**Starting and finishing dates:** 03.01.2001 – 30.06.2001.

**Abstract:** A detailed transport survey involving all aspects of the local public bus transport system was carried out, together with widespread interviews concerning the initiation and destination of travel as requested by the local council. Information was gained not only on the journeys made by public transport, but also on the nature, social status, residence and general travelling habits of the passengers.

In the study an evaluation of absolute character and a relative assessment related to the data of the years 1991 and 1996 were given concerning the passenger volume and the services offered. An analysis of the economic situation of the local bus transportation was carried out separately for the urban and suburban networks.

An information base was achieved for the Szabolcs Volán Co. Inc. containing the transportation and travel demands, i.e. loads of bus lines of the town *Nyíregyháza*. The data of the full time counting of the days of Wednesday, Saturday and Sunday was also fed into this database, which was further enlarged by the similar counts of 1996.

**Key words:** public transport, Nyíregyháza, economic analysis, information base of local public transport by bus.

**Ref. number:** 220-021-2-1

**Title:** Elaboration of an up-to-date method for the satisfaction of the transport demands of pupils in the country town of Jászberény and its catchment area.

**Responsible leader:** Ms. Anna Kocsis

**Commissioner:** Jászkun Volán Rt.

**Consultant of the Commissioner:** Károly Polovics

**Starting and finishing dates:** 10. 05. 2001 – 28. 09. 2001.

**Abstract:** The purpose of the study was to get to know the transport demands of primary school pupils, taking into consideration the changes in the teaching system, i.e. freedom of choice of school and higher education in the eight-year system, and to submit proposals for a rational performance of the transport. The following were carried out in order to achieve the aims mentioned above:

- a description of the evolution of the school-system in 18 localities of the area and its effect on public transport;
- the development of the pupil transport demands during the period studied and the expected demands were surveyed initially in two important towns in the area;
- some special reviews of foreign and domestic school bus transport systems were carried out;
- based on the information acquired, a proposal was elaborated for the planning of school bus lines transporting primary school pupils in and around the town of Jászberény, also taking into account the bus-fleet required.

**Key words:** public transport, school system, transport of primary school pupils, school bus lines.

**Ref. number:** 220-010-2-0

**Title:** The possibilities of adopting the pool-system in the inland intercity (long distance) public transport serviced by the Volán Bus Services Co. Inc.

**Responsible leaders:** Dr. János Berényi; Mrs. Endréné Trepper.

**Commissioner:** Kunság Volán Rt.

**Consultant of the Commissioner:** Szabolcs Hunyady

**Starting and finishing dates:** 01. 12. 2000 – 15. 05. 2001.

**Abstract:** The possibilities of adopting the pool-system largely used in international scheduled transport by bus was surveyed in the study, bearing in mind the direct purpose of a transport system, i.e. to assure a uniform public transport service in a given relation, or at a line independently of the operators, on a high level and with a wide choice of travel lines, as well as to increase the number of passengers.

Alternatives were elaborated for the line between *Budapest* and *Kecskemét* as well as for the total length of this long distance public transport service run on the same route, taking into account the type of bus used, the services offered on the line, and the division of the returns and costs among the operators. Finally, a draft pool-contract was prepared.

It is considered necessary to emphasise that this was the first serious attempt to prepare such a method in Hungary, so the result should be considered as something of a raw variation. Its further development could only be made collectively, with the staff performing the practical operation.

**Key words:** transport in pool-system, scheduled interurban public transport by bus.

**Ref. number:** 220-029-2-1

**Title:** Elaboration of a logistic service system in accordance with the market demands of the logistic centre in Sopron (member of the nationwide network of logistic centres), operated by the *Győr-Sopron-Ebenfurth Railway Co. Inc.*

**Responsible leader:** Béla Nógrádi

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, Károly Józsa.

**Starting and finishing dates:** 20. 03. 2001 – 30. 11. 2001.

**Abstract:** The RAABERLAD Management of the GYSEV operates the *Sopron* member of the nationwide network of logistics centres. This complex was built with significant investment by GYSEV, and has an important role in the fulfilment of the logistic service demands in the area. Its service activities are connected primarily to transport by rail and combined transport. A significant part of this service is linked to the cross-border transit traffic. It is hoped that of our accession to EU membership is not too far away. The services connected to the cross-border transport should be reappraised in a land without borders. Certain logistic service demands will become redundant. The logistics centre in Sopron should adapt itself in good time to these changes, and develop such a logistic service system as would offer more services for local demands than for those of cross-border transport. Within the frame of the study a strategic conception has been worked out, providing proposals for the accommodation of the above mentioned changes in the near future.

**Key words:** logistic service centre, combined transport, customs administration, rail transport, area of attraction, EU membership, swap-body transport.

**Ref. number:** 220-035-1-1

**Title:** Evaluation of the impact on environmental protection and accident prevention of the limitation of road traffic at weekends and public holidays.

**Responsible leader:** Béla Nógrádi

**Contributors:** Mrs. Sándorné Földesi; Environmental Protection and Acoustics Division of KTI Rt.; Division of Automotive Engine and Exhaust Emission Technology of KTI Rt.; Division of Traffic Safety and Traffic Engineering; Roadtech Kft.

**Commissioner:** KÖM

**Consultant of the Commissioner:** Ms. Zsuzsanna Bibók

**Starting and finishing dates:** 11.07.2001 – 30.09.2001.

**Abstract:** Five years after the introduction of the ban on traffic of heavy vehicles at weekends and public holidays, a Ministerial decree made it mandatory for the competent authorities (Ministry of Transport and Water Management and Ministry for Protection of the Environment) to carry out a detailed study on the impact on environmental protection. The elaboration of the study was charged to the Institute for Transport Sciences Ltd. Within the frame of the study, the following were examined in detail:

- comparative evaluation of the limitation of the traffic of heavy goods vehicles at national and international level;
- detailed analysis of the traffic based on data acquired by observation of the traffic, representative traffic counts and international road transport of goods;
- analysis of the impact on the environment based on the traffic data acquired and noise and emission measurements taken at spots of representative traffic counts;
- evaluation of the accidents caused by heavy goods vehicles based on the statistical data records of accidents;
- comparative evaluation of those enjoying exemption and the administrative process of granting exemptions, as well as international practice;
- evaluation of the roads strictly protected by prohibition;
- analysis of the recommendation of the EU and the possibilities of an adapting modifications of the national regulation.

This profound analysis of the impact on environmental protection gives a foundation for the development of such traffic limiting regulations as would much better harmonise regulations with those of neighbouring countries, and at the same time be suitable for domestic conditions.

**Key words:** heavy goods vehicle, traffic limitation, traffic counting, noise, emission, accident, vehicle mass, average daily traffic.

**Ref. number:** 220-011-1-0

**Title:** Activities to be carried out in connection with the tender in the case of the expiring concession contracts in the field of interurban public bus transport, and the further development of the supervision of the activities of five other concession companies

**Responsible leader:** Dr. István Zsirai

**Contributors:** Anna Kocsis; Dr. György Hingyi, lawyer.

**Commissioner:** Ministry of Transport and Water Management

**Consultant of the Commissioner:** Béla Takács

**Starting and finishing dates:** 8.12.2000 – 30.10.2001.

**Abstract:** One part of the task involved the drafting and effectuation of the arrangements in connection with the expired concession for the operation of the public bus line service between *Szigetújfalu* and *Szigetszentmárton*, which required the following:

- compilation of documentation for the tender;
- arrangement of the tendering (call for tender, sale of the tendering documentation, continuous information of the applicants, reception of the tenders, opening the tenders, etc.);
- providing assistance to the judging committee in making its decision concerning the tenders and elaboration of expert opinions;
- preparation of the contract with the winner regarding the documentation of the required contracting arrangements.

The other parts of the study comprised the following recommendations:

- how to follow closely the activities of all operating concession companies;

- executive methods of the inspections, and
- approval of the timetables.

**Key words:** transport by bus, public transport, concession.

**Ref. number:** 220-014-1-1

**Title:** Evaluation of the opinion of passengers on the quality of the services offered on the scheduled local public bus network operated by the local branches of the Volán Union.

**Responsible leader:** Dr. István Zsirai

**Contributors:** Lajos Vass; Mrs. Sándorné Földesi; Ms. Annamária Bohn; Aktuális Kft.

**Commissioner:** Volán Syndicate

**Consultant of the Commissioner:** János Balogh

**Starting and finishing dates:** 20. 02. 2001 – 10. 08. 2001.

**Abstract:** A study dealing with the interurban public bus transport operated by the Volán companies was completed in 2000. The study revealed the levels of passenger satisfaction with the service offered in a detailed survey. The purpose of this study was to complete the results of an earlier study on the local public transport and at the same time to work out a marketing strategy for the local public transport branch.

It should be mentioned in advance that it is very important and difficult to devise a suitable strategy because of the fact that nationwide, local public transport by bus is currently losing about 25 million passengers per year.

In accordance with the requirements of the task, more than 23 thousand passenger interviews were carried out between 18<sup>th</sup> March and 29<sup>th</sup> April, 2000 and the processed result served as the assembly point for this theme.

The result of the procedure, assisted by a computer programme developed by KTI-TRANSORG, consists of approximately 10 thousand tables with data and accompanied by an explanatory text.

The structure of the study made it possible for every company to be informed of the general situation in the country with regard to the tendencies concerning the relative situation of each area, as well as the recommended marketing and other tasks to become acquainted in detail with their own appraisal. Thus each company could determine how to organise their own activities more successfully.

As a result of this survey, the study gives a general picture of the appraisal of the local public transport from the viewpoint of the passengers, as well as the current situation and a marketing conception for the development needed.

**Key words:** public transport by bus, passenger interview, transport services.

**Ref. number:** 220-025-2-1

**Title:** Re-evaluation of the network system of the logistics service centres.

**Responsible leader:** Dr. István Zsirai

**Contributor:** Mrs. Sándorné Földesi

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, KöViM; Lajos Nagy, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.11.2001.

**Abstract:** Founded on the results of numerous research carried out in 1993, the Consulting board of the Ministry of Transport adopted a decision on the organisation of a network of domestic logistics service centres (abbr.: LSC) to be linked to the European network.

The conception also determined the ten areas where, according to the presently accepted principles, 12 nationally important logistics service centres are to be operated.

This nationwide network started the development assisted by subventions and local initiatives, but at the same time, trends in the international trade of goods were changing and the big stores and trade centres backed by private capital were being developed.



These facts may influence the earlier plans, that is why an assessment seems necessary, i.e. the role of each LSC in the network at present and their role they would play in the future.

The aims and structural features to be considered for each LSC are all described in the study.

The conception continues to state that:

- large, nationwide LSCs are needed;
- the role of LSCs will be as regional gathering and storing centres, carriers to the nationwide logistics service centres,
- other logistics services may also be part of the system.

Under the conception certain elements of this hierarchical LSC structure remain stable, while others are more flexible.

The three levels of the network reflects the different interests of the nation, as follows:

- at the highest level are the nationwide LSCs; they perform their duties on a large scale. They are located at rail-road centres, and when possible where rail-road junctions and inland waterway ports are also available,
- the regional LSCs perform their duties at a lower level (rail connection is not always available, and the services offered are more-or-less limited, etc.);
- other logistics services also contribute to the overall goal as they assist in the build-up of the structure of services.

The study outlines that the regional LSCs can form a structural supplement to the nationwide LSCs; these may be of the following types:

- those container terminals which are not part of an LSC, but are situated in the vicinity of an LSC,
- those inland waterway ports which are not inside an LSC or in the vicinity of it; or are not bound to the LSC, as a virtual centre;
- industrial parks which offer well operating logistics services;
- those ÁTI Rt. premises which are not part of the nationwide network;
- those private premises which are capable of satisfying the demand of a given region at an adequate level.

In the realisation of the conception, it should be considered that it is in the interest of the state for the nationwide network of LSCs to be built up. This helps the development of the combined transport branch, the servicing of the traffic in the international transport corridors, the transfer of the transport by road to the rail, the better utilisation of the railway infrastructure, etc; in short, all considerations which serve the national interest.

**Key words:** logistics service centre, network of nationwide logistics service centres, combined transport.

**Ref. number:** 220-026-2-1

**Title:** The evolution of the logistics service centres and elaboration of the concept of their authority and financing.

**Responsible leader:** Dr. István Zsirai

**Contributor:** Mrs. Sándorné Földesi

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, KöViM; Lajos Nagy, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.07.2001.

**Abstract:** This theme deals with more, relatively self-contained but still remotely related topics of the LSCs.

These are as follows:

- to draw the necessary consequences from the evolution of foreign LSCs, these were analysed and evaluated against the domestic LSCs;
- the problem of their sphere of authority was first approached on a theoretical level, but the evaluation, i.e. the revision was carried out experimentally;

- the topic of finance was examined, taking into account foreign practices, but at the same time analysing the national peculiarities.

As a result, propositions on the sphere of authority were drafted, emphasising that a critical factor of its solution would be the realisation under the conditions of the market economy.

When the conception of finance was set up, an alternative one - considering numerous scenarios - was proposed.

The proposal contains the following:

- cost demand of each solution,
- their impact on the system of LSCs,

thus offering the chance to choose.

**Key words:** logistics service centre, nationwide network of logistic centres, combined transport.

**Ref. number:** 220-031-2-1

**Title:** Survey of the actual activities of TÉKISZ Rt., and its possibility of joining the nationwide network system of logistics service centres (abbr.: LSC) within the logistical area of Záhony.

**Responsible leader:** Zsolt Béla Garda

**Contributor:** Mrs. Sándorné Földesi

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, KöViM; Lajos Nagy, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.11.2001.

**Abstract:** After overcoming the economic difficulties caused by privatisation, structural change and market opening, the Hungarian economy has progressively expanded, and this is also reflected in transport output. The constant expansion indicates the growth of the economy, which, in turn, requires an appropriate infrastructure. The nationwide network of LSCs is destined for the establishment of such multimodal centres and a network, also taking into consideration at the same time economic and ecological aspects. The incompleteness of the building up and the slow rhythm of development of the nationwide network have resulted in the establishment of numerous individual and privately financed LSCs in the last years in Hungary, based, in the overwhelming majority of cases, on carriage by road. These centres could possibly have been set up as elements of the nationwide network. Such an acceleration in the extension of the national network which already allows the operation of its individual sections seems advantageous.

The possibility of including TÉKISZ Rt. in the nationwide network, as a unit of the ZÁHONY area was examined according to the concept described above, since many servicing units offering exclusively LSC services are already operating in this area and have the reserves to grow bigger, as well as traffic and transport connections and plans for the future. The study reveals the present activities and position of TÉKISZ Rt. in the logistics area of Záhony, compares it with the other logistic capacities and the other enterprises involved; furthermore, the study researches the possibilities of co-operation between such enterprises and the role of partnerships through a proposable operative partnership.

**Key words:** logistics service centre, Záhony, TÉKISZ Rt., Záhony Inland Waterway Port, Tuzsér.

**Ref. number:** 220-024-2-1

**Title:** National benefit of logistics service centres, and their part in the supply chain and regional development.

**Responsible leader:** Gyula Simon

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, KöViM; Lajos Nagy, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.11.2001.

**Abstract:** The study describes the current situation of the development stage of the logistics service centres (abbr.: LSC) belonging to the national network, i.e. 12 centres of the enlarged network.

The study surveys the features of the supplementary, conveying and co-operative activities together with an analysis of the theoretical possibilities. Conclusions may be drawn concerning the role to be fulfilled in the supply chain of the given LSCs as well as in the given region.

In the finishing section of the theme, an evaluation of the area of attraction of a selected region, more precisely, that of the planned LSC in *Szeged*, was carried out based on the relations between the commissioners and the service-provider.

The economy of the South Great Hungarian Plain was also characterised in this section of the study, as were the providers of the logistics services operating in the area of attraction of the planned LSC and their activities. The features of the MJV strategy of development of the country town *Szeged* in relation with the planned LSC was examined and the advantages and disadvantages of the realisation of a virtual LSC in a short period of time were also discussed.

**Key words:** logistics service centre, area of attraction, virtual LSC.

**Ref. number:** 220-027-2-1

**Title:** Examination of the possibilities of co-operation among the main logistics service centres belonging to the nationwide LSC network and other logistics organisations operating in the area of attraction of the LSCs; effects analysis and conditions of co-operation.

**Responsible leader:** Gyula Simon

**Commissioner:** MÁV Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, KöViM; Lajos Nagy, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.10.2001.

**Abstract:** In the frame of the theme the detailed examination and characterisation of the other organisations offering logistic services and settled in the regional environment and area of attraction of the main logistics service centres (abbr.: LSC) of the national network, i.e. those of *Sopron*, *Székesfehérvár*, *Budapest* (BILK) and *Záhony*, were carried out. They are the industrial parks in the region, and the larger competitors which also advertise their logistics services in their denomination or logo. A list of addresses was compiled listing those smaller enterprises, eventually privately operated which offered haulage, storing or other logistic services.

The changes over the past years in the economic structure of the regions involved in the area of attraction were examined and revealed. The trends experienced in these years with regard to the incoming and outgoing international goods carriage by road and rail in the area of attraction were also studied.

The centre currently under construction in the area of *Székesfehérvár*, as a centre already partially operating, was analysed in order to show the characteristic demands and possibilities of co-operation. The conclusions drawn may also be useful for the other centres. Based on the experiences gained, it can be stated that the terminals of the combined transport of the LSCs should at all costs be integrated into the direction systems of railway traffic. These systems form unavoidable bases of the direction of the flow of goods transport by rail, and thus form basic elements of the connection among the LSCs. This network also ensures the contact with places of goods transport by rail outside other LSCs.

In those places where the physical achievement of an LSC at one single place can not be established at present but logistics services are in demand, the organisation of a virtual logistics centre should be preferred, as a temporary solution. Information channels can connect places which have been designated functions. During the time when the co-operation is based on information channels, the co-operation among the LSCs and the other logistics services could also gradually be strengthened.

Numerous enterprises, providing services ranging from combined transport to security services, co-operate at the premises of an LSC offering full or complete services. This co-operation is confirmed by contracts, as is already partially the situation in *Székesfehérvár*.

**Key words:** logistics service centre, area of attraction, virtual LSC, railway information systems.

**Ref. number:** 220-032-2-1

**Title:** The national economic benefit of the combined carriage of goods by road and rail, the prospects for evolution and the proposed trend of development in Hungary.

**Responsible leaders:** Mrs. Miklósné Szilágyi

**Commissioner:** GYSEV Rt.

**Consultant of the Commissioner:** Dr. Attila Csaba, KöViM; Károly Józsa, MÁV Rt.

**Starting and finishing dates:** 20.03.2001 – 30.09.2001.

**Abstract:** The national government expressed the desire that the regulation and development of the domestic combined transport should be harmonised with the relevant directives of the European Union.

In accordance with its aim, the study outlines the importance of combined transport in transportation policy, the national level of development and the state of its regulation.

The new transportation strategy of the EU is based on the principle of sustainable mobility. Therefore, such integrated transport policies should be developed on the one hand within the Community, and on the other hand by those countries applying for membership, as place a great deal of importance on the reduction of the load on the environment. The goal of the revision of the national transport policy, currently being elaborated, shall be to promote environment-friendly modes of transport, in harmony with the principles of the Community.

In the interest of successfully adhering to the system of regulations and practice of the EU, the following main goals shall be laid down in the development of the domestic combined transport of goods:

- the development of the national sections of the Pan-European transport corridors;
- building or enlarging terminals to assure the supply of the infrastructure;
- giving continuous provision for the harmonisation with the law-system of the EU.

Gradual promotion shall be ensured by state subsidies and allowances to the unaccompanied combined transport modes (by containers or swap-bodies) instead of the Ro-La (rolling highway) mode of transport.

**Key words:** combined transport, transport policy, candidature to EU membership.

**Ref. number:** 220-039-2-1

**Title:** Compilation and analysis of the experiences gained by European traffic-psychological tests in retraining courses for their application in the national regulations related to the retraining of drivers.

**Responsible leader:** Mrs. Miklósné Szilágyi

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Zoltán Papp

**Starting and finishing dates:** 06.2001 – 14.12.2001.

**Abstract:** The conditions for the retraining of drivers were partially changed by act № CXXVII, on the demerit point system applied to drivers, issued in 2000 and enacted on January 1<sup>st</sup> 2001.

The changes in the act made necessary the supervision of the preventive measures in connection with the retraining of offending drivers. Within the frame of the supervision, the discipline and the content of the traffic-psychological procedures and methods applied in the retraining course should also be revised.

The conditions of the participation in driver retraining are currently regulated by government decree № 139/1991 (X. 23.). This decree prescribes the content of the retraining in a programme divided into seven groups by subject matters, with the instruction that the type of programme aimed to correct the driver's behaviour in traffic for a given driver shall be preceded by a traffic-psychological test to determine which programme the driver is likely to enjoy. The traffic-psychological tests used in the cases mentioned above, and similar ones used to determine the abilities of learner drivers or professional drivers are to be revised and brought up-to-date.

Methods of this kind generally used in Europe should be taken into account as part of the revision process.

The collated European experiences may provide guidelines, or modify the content of the retraining programmes, together with the various types of personality tests, i.e. methods and techniques of taking into consideration previous traffic behaviour (e.g. police record).

Based on the results of the research, it has been proposed that the programmes used for retraining our drivers be reduced to the following three types:

- knowledge of traffic regulations and driving capacities;
- participation in road traffic and defensive driving; and
- participation in road traffic under the influence of alcohol or other medicaments or drugs detrimental to the ability to drive.

**Key words:** demerit point system, driver retraining, traffic-psychological tests.

### *Division of Transport Economics*

**Ref. number:** 271-001-1-1

**Title:** Strategy for further development of the *Győr-Sopron-Ebenfurt Railway Co.*

**Responsible leader:** Dr. József Pálfalvi

**Contributor:** Árpád Tóth

**Commissioner:** GySEV Rt. Vezérigazgatósága

**Consultant of the Commissioner:** Dr. László Fehérvári

**Starting and finishing dates:** 02.11.2000 – 20.04.2001.

**Abstract:** KTI Rt., commissioned by GySEV Rt., undertook to outline the future prospects of the railway company over the next decade, including the company's efficient activity and the elaboration of a development-promoted mission, the company goals and the implementation strategy. Work was fulfilled in several stages:

1. Benchmarking - the company's operation level has been determined. Benchmarking as a procedure has become more widespread in recent times.
2. Situation analysis – schemes of the company's existing strategy were evaluated and compared with EU directives, and the transport market was analysed, with special regard to the freight and passenger transport of the region; factors of the macro-environment were examined – with particular stress being placed on the regional changes to be expected, and legal and political factors. Business relations and organisational characteristics were analysed and the company's competitiveness examined.
3. Scenarios – based on the above, possible development trends were elaborated and potential alternatives presented; the scenarios prepared had different development variants.
4. Implementation of the strategy – the topic of debate could be submitted to the management and owners. Formulation of mission, strategy goals, strategy plan, future company tasks.

**Key words:** company strategy, benchmarking, situation analysis of railway goods traffic.

**Ref. number:** 271-002-1-1

**Title:** Implementation of R&D tasks relating to the elaboration of the complex training system of the safety advisers to be employed in the field of inland waterway transport of dangerous goods.

**Responsible leader:** István Vas

**Commissioner:** KöViM Szervezési Önálló Osztály

**Consultants of the Commissioner:** Lajos Bujdosó; Ms. Marianna Csuha

**Starting and finishing dates:** 07.12.2000 – 30.05.2001.

**Abstract:** Since, over the past years, the quantity of dangerous goods carried in domestic and international transport has grown significantly, the accident risk has also increased, and the EU framed *Directive 96/35/EC* relating to the appointment and professional qualification of a safety adviser to be employed in road, rail and inland waterway transport of dangerous goods. However, the relevant directive does not contain detailed regulations with respect to the requirements for the examination of safety advisers, harmonised between the different countries, or to the boards of examiners, which has led to the issue by the EU of *Directive 2000/18/EU*, laying down the minimum examination requirements for a safety adviser engaged in road, rail and inland waterway transport of dangerous goods. In order to reduce the accident risk in these areas, and in compliance with the EU law harmonisation requirement, the framing, and putting into force in Hungary of the two EU directives mentioned above are under way.

Consequently, a domestic training programme for safety advisers employed in the transport of dangerous goods had to be elaborated in full compliance with the above mentioned directives. This document forms a part of this work and summarises briefly, on the basis of the relevant directives, the minimum requirements relating to the training and examination of the safety advisers; as well as the basic principle of their training system, it presents a proposed general syllabus, and, furthermore, contains the proposed collection of the examination issues.

**Key words:** carriage of dangerous goods, training, access to the profession, law harmonisation.

**Ref. number:** 271-003-1-1

**Title:** Scheduled bus transport engaged in public service in the EU member states.

**Responsible leader:** Dr. József Pálfalvi

**Contributors:** Mihály Békefi; Dr. Péter Honti.

**Commissioner:** VOLÁN Egyesülés

**Consultant of the Commissioner:** Ms. Dr. Ildikó Marcsa

**Starting and finishing dates:** 14.03.2001 – 30.09.2001.

**Abstract:** The aim of the survey was to study, from the sides of generally characteristic regulation, the conditions of operation, the management system, and the situation of the bus transport companies and enterprises engaged in scheduled public service in the EU. The course of research, the study that summarised the findings includes three main parts:

1. Exploration and analysis of special literature related to the subject.
2. Elaboration and evaluation of the questionnaires sent to bus transport companies and their business federations operating in the EU.
3. Synthesis of the results obtained in the two ways.

Main conclusions:

1. If the VOLÁN companies remain in the future bus companies carrying out scheduled public service, then government financing – at least partially – is unavoidable, because only in this case can it offer an attractive alternative to private transport.
2. In EU member states, the EU rules are valid (including among others the following: *684/92/EU*, *11/98/EU*, *12/98/EU*, *98/76/EU*, *1191/69/EU*, *1893/91/EU*, *3820/85/EU*, *3821/85/EU*). In these cases, some interpretation differences which enhance the existing transport divergences between the countries may also arise. In addition, it can be mentioned that the notion of public service in the EU is not a key question, but an evidence.
3. The concept that each country should maintain in their public transport the national characteristics and reasonable discrepancies, and that differences should not be eliminated, but efficient, attractive and integrated public transport systems should be developed in each EU country, might be taken as a basic principle.
4. Private capital plays an ever greater role in relation to ownership, although, for the time being the spreading cannot be considered as being fast. Nevertheless, it may be assumed that by 2020, transport will become fully privatised. This tendency is being accelerated by the fact that the possibility for the involvement of the private sector is increasingly ensured by EU authorities.
5. Reduction of travelling prices: Replies of the different countries show many similarities; subsidies exist in all countries, although there are differences in validity (national, regional, etc.) Support provided to a company's competence does not exist anywhere, at least not in the range of the companies which replied. Sometimes the authorities expect the operators to meet some special requirements in the area concerned, for example to reduce fares for the aged, or to support integrated information. However, it would be difficult to expect the authority to conclude contracts separately with each individual operator.
6. Granting public service: public transport always needs support, and relevant estimations should take into account environmental impact, passengers' mobility demand, investments in public road systems and other infrastructure, etc. Public service should have the same quantitative and qualitative parameters, no matter who the service provider is, and this needs

competition that is transparent, well documented and accessible for any appropriate service provider, but supported by the competent authorities.

**Key words:** public service, bus transport, regulation of bus transport, VOLÁN Union.

**Ref. number:** 271-014-2-1

**Title:** Survey of heavy cross-border traffic.

**Responsible leader:** Mrs. Dr. Ervinné Szentes

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Balázs Farkas

**Starting and finishing dates:** 10.04.2001 – 30.11.2001.

**Abstract:** Based on aspects of road management, special attention should be paid to the traffic of overweight and oversize vehicles, for the protection of the highway network and its facilities (especially bridges); this is partly because overweight cargoes overburden the pavement structure to an essentially greater extent than the average, and partly because, as a follow-up to EU accession, higher GVW and axle weight limits are to be expected, for which the appropriate bearing capacity of the roads should be achieved. On the basis of observations made over four years (road management contributions), it can be stated that in the cross-border heavy vehicle traffic, the initial decrease in the over axle weight rate has stopped, and, since the year 2000, there has been a steady increase in the volume of vehicle traffic bound to permission; with respect to both axles and total mass the traffic of overweight vehicles has increased 1.5–2 times. Using the vehicle traffic data, traffic volume maps of the national public road network were prepared, illustrating well the transit and directional traffic volumes of the public roads. By surveying the transit/directional distribution of the heavy traffic at different border crossing points, it may be stated that transit is higher at the southern border sections, while directional traffic is higher at the western and northern parts of the borders. These data may be used directly in the pavement development and strengthening plans of the road management.

**Key words:** heavy goods vehicle traffic (cross border), overweight vehicle, overmass weight, over axle weight, traffic volume map, transit/directional traffic rate, border crossing data, road management contribution.

**Ref. number:** 271-015-2-1

**Title:** Responsibility of road managers and carriers; analysis of relations of cargo insurance in road freight transport subject to route permission.

**Responsible leader:** Mrs. Dr. Ervinné Szentes

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** György Bozán

**Starting and finishing dates:** 10.04.2001 – 30.09.2001.

**Abstract:** National and international insurance contracts on road haulage and the requirements on the content and form of the contracts, with special regard to overweight and oversize cargoes were studied in detail. Different insurance contracts were evaluated from the viewpoint of road management and two subject matters were detailed:

- compulsory motor vehicle liability insurance and its possible consequences relating to public roads and road engineering structures;
- cargo-related insurance problems.

It was stated that compulsory motor vehicle liability insurance excludes from the scope of liabilities the indemnity for damages caused to the road and its equipment. Indemnity is confirmed only if the party at fault in the damage can be caught in the act and did not follow the designated route. Repair of any damage caused is the responsibility of the road management. For a fair division of liability and the common bearing of burdens, the following can be proposed: introduction of a carrier's statement, increased frequency of controls, more frequent use of prohibitory signs, up-to-date data basis for route designation and conclusion of contract on road management activity.



**Key words:** mandatory motor vehicle and cargo insurance, heavy goods vehicle, route designation.

**Ref. number:** 271-017-2-1

**Title:** Surveying the conditions of the putting into, and keeping in traffic of oversize buses.

**Responsible leader:** Mihály Békefi

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** György Bozán

**Responsible leader of the Commissioner:** Dr. Péter Lányi

**Starting and finishing dates:** 14.05.2001 – 16.06.2001.

**Abstract:** Several thousand buses over 12 m length are already operating in European countries. Long buses are used in urban, suburban, long distance and pleasure traffic alike. Rules are different in each country. In some countries single buses longer than 15 m are free to participate in traffic, while in others this is forbidden. In compliance with current Hungarian rules, the setting into traffic of oversize buses is subject to KöViM permission. In 2000 and 2001, approximately 20 long buses were purchased by VOLÁN companies, operating with permission.

According to national and international experience, long buses can be operated on the existing road system, however, from traffic aspects, there exist critical sites and road sections:

- in urban traffic: narrow streets congested with parked cars;
- narrow roads and, road sections with tight curves;
- some types of roundabouts;
- service facilities (fuel stations, repair shops, etc.).

The sites listed make the traffic of all long vehicles in general difficult, or even impossible, but especially so for buses of 12 m in length. If the traffic routine of large vehicles is observed, and critical situations are avoided, traffic of long buses can be permitted.

Of course, technical parameters of oversize buses have to be regulated. Parameters relating to vehicle size and mass have to be limited by these regulations, in addition to those regulations laid down with general scope involving all vehicles.

Problems arising from the size of oversize (long) buses, which have to be solved primarily by the constructors, are as follows:

- Keeping the turning characteristics within specified limits
- Keeping the axle-weights within limits.

The European Parliament and Council prepared the proposed amendment of Council Directive 96/53/EC concerning the maximum permitted size of road vehicles engaged in domestic and international traffic on the territories of the Community, as well as the maximum weight limits of those engaged in international traffic.

In accordance with the Hungarian standpoint, following the EU amendment, adoption would also be expedient for Hungary.

**Key words:** oversize bus.

**Ref. number:** 271-018-2-1

**Title:** Taking a survey of the population affected by the through road traffic carried on the national road network sections of built-up areas (elaboration of a surveying method).

**Responsible leader:** Mihály Békefi

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Ms. Margit Schulz

**Responsible leader of the Commissioner:** András Rétháti

**Starting and finishing dates:** 21.05.2001 – 24.10.2001.

**Abstract:** This piece of work, implemented on behalf of ÁKMI Kht. and involving a survey of the population concerned by the effects of road transport carried on the sections of the national

road network passing through built-up areas, can be considered as a preparatory work, covering more than a decade of assessment of the built-up areas, and at the same time an independent document, drawing conclusions.

Work was helped by regional, county and local statistics, maps of the localities by counties, and above all, by the survey of a total of 363 localities and their 550 000 inhabitants. The survey was performed on a sample, which was selected from the localities lying within a 20 km distance from the track of the planned expressways.

As a result of the data surveyed, answers have been obtained to the following queries: how many people are concerned and what proportion of the population is directly affected by the through traffic.

The rate of those concerned is mainly interrelated with the size of localities, and is inversely proportional to it. Using several characteristic data of the localities, a combined indicator has been drawn up with which the evaluation of different villages and towns could be realised. In summary, according to the indicator the situation of the population living in the majority of the localities included in the sample can be considered as relatively favourable. Acquainted with the data, all localities across the country can be evaluated with the method elaborated.

In addition to involvement, other surveys have also been carried out, e.g. the transit traffic of localities. In this respect, 36% of the localities are in a position more advantageous than the average, while 26% are below the average.

Indicators showing the quality of transit roads or the opinions formed on them, according to the survey, are slightly better than the average, however, there are essential differences by areas (counties) and qualifying factors.

Opinions concerning the effects of the relevant road traffic also vary from area to area. Notwithstanding these differences, daytime noise is named as the most negatively considered harmful effect everywhere.

In the case of initiatives related to the improvement of the quality of roads and the mitigation of harmful effects, demands for the improvement of the conditions of the roads were of the highest rate, while the rate of implementation was most favourable in the case of speed limitation signs (a relatively cheap solution).

It is surprising that in over 80% of the localities there are no marked out pedestrian crossings on through roads.

Most of the interviewees expect favourable effects from the implementation of the planned expressways. A little more than one tenth of the localities are counting on disadvantages. Daytime noise is ranked in first place. Of the favourable effects, the following are mentioned in first place: launching of enterprises, economic boom, relieving the actual traffic of roads, decrease of heavy traffic, new job possibilities, accessibility of localities, development of tourism.

**Key words:** effects of road traffic, involvement of population, statistics survey, national road system.

**Ref. number:** 271-024-1-1

**Title:** Law harmonisation tasks concerning the social (labour) conditions of the crews of vehicles engaged in road transport.

**Responsible leader:** Lajos Tóth

**Commissioner:** KöViM Gazdaságstratégiai Főosztály

**Consultants of the Commissioner:** Ms. Dr. Márta Kiss; Iván Helcz

**Starting and finishing dates:** 30.05.2001 – 28.10.2001.

**Abstract:** Within the framework of this study, a detailed description on the current Hungarian regulation was presented, based primarily on the *Code of labour legislation* and the subsectoral *Collective Labour Contract*.

After the presentation of the situation in Hungary, an examination and analysis was made of the international labour regulations laid down for the working conditions of crews engaged in passenger and freight transport by road.

Council Regulations 3820/85 (EEC) and 3821/85 (EEC) were analysed in detail, as were the related AETR Agreement and the interrelations of these two European regulation systems. The application of the instruments referred to in the EU member states was presented in a separate chapter.

Following the theoretical foundations, the problems of the introduction in Hungary were discussed. The adaptation terms of the EU regulations at the VOLÁN companies, and other road transport sectors were examined in detail.

In part three of the study, the probable effects of the planned introduction were analysed; these were namely, issues of personnel, material and official competence relevance, as well as the costs incurred.

**Key words:** social regulation, travelling crew, driving time.

**Ref. number:** 271-028-1-1

**Title:** Survey of the situation of enterprises engaged in domestic goods transport by road, paying special attention to the EU accession-related effects exerted on national carriers.

**Responsible leader:** Dr. József Pálfalvi

**Contributor:** Aktuális Kft.

**Commissioner:** KöViM, Gépjárműközlekedési Főosztály

**Consultant of the Commissioner:** László Ágai

**Starting and finishing dates:** 02.05.2001 – 31.08.2001.

**Abstract:** In April 2001, *KöViM Regulation 14/2001.(IV.20.)* relating to the requirements on professional and licensing procedures in national and international road haulage was issued in compliance with similar EU rules. Since, in comparison with the antecedents, this regulation results in essential changes in the history of a road transport enterprise, the aim of the research was to survey the extent to which those involved recognise the relevant regulation, how it was accepted, what the reactions to it were, and to what extent the business is going to be influenced in the future. The main findings of the survey were as follows:

1. 17% of the road haulage enterprises had not yet heard of Regulation 14/2001.(IV.20.) KöViM; 83% knew of its issuance, and only 20% admitted to not knowing every prescription of the regulation.
2. Road haulage enterprises consider that in the case of tariffs, from their viewpoints the market conditions have changed negatively, and the terms of demand and supply have also changed at their expense (oversupply has increased).
3. Assuming accession to the EU in the not too distant future, 16-17% of the domestic road haulage enterprises cannot answer the question as to whether they could be competitive on the unrestricted EU market.
4. It may be considered as a general rule that the enterprises with legal entities, which also deal with road haulage (share companies and limited liability companies) are more self-confident than the firms without, such as the undertakings operating one, two or three trucks, limited partnership companies and public utilities; this latter group are the most likely to become the losers in the case of EU accession.

**Key words:** EU accession, road hauliers, competitiveness, access to the profession.

## Division of Transport System Research and Network Planning

**Ref. number:** 212-030-2-0

**Title:** A comprehensive road network development conception of the Northern Hungarian Region.

**Responsible leaders:** Dr. Attila Vörös; Péter Miksztai; Ms. Éva Hingyi.

**Contributors:** László Czeglédi; Mrs. Istvánné Beszedics; Mrs. Dr. Jenőné Rimaszombati.

**Commissioner:** UKIG

**Consultants of the Commissioner:** Mrs. Mária Hamarné Szabó; Zoltán Pál.

**Starting and finishing dates:** 01.08.2000 – 15.03.2001.

**Abstract:** The objective of the road network development conception of the Northern Hungarian Region was the realisation of the aims of the transport policy, as laid down in Hungarian Parliamentary resolution [68/1996. (VII.9)].

The aim of the project was the development of the road network in such a way as to ensure high satisfaction of traffic demands within the region, as well as with neighbouring countries and in the Hungarian regions around the area of the Northern Hungarian Region.

This study attempted to reveal the history of the infrastructure, and to show the probable global, economic, social and traffic development tendencies of the present Northern Hungarian Region, as well as suggesting the development which may be achieved in the road network by 2030.

**Key words:** traffic network development, Northern Hungarian Region.

**Ref. number:** 212-031-1-0

**Title:** Road traffic safety on newly-built by-passes, and the changes in the safety situation on the relieved and on the connecting road sections on the basis of Hungarian case studies

**Responsible leaders:** Gábor Albert; Dr. Attila Vörös.

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Péter Vasi

**Starting and finishing dates:** 15.08.1999 – 15.10.2001.

**Abstract:** The initiative was designed to provide an answer to the question of how new by-pass roads altered traffic safety in the relating area.

The comprehensive study comprised all the by-passes for which accident data were available for a minimum of two years for both the “before” and “after” periods.

Accidents in the area of six typical sections were analysed in detail, and the changes in traffic safety evaluated. Furthermore, solutions to the problems were also proposed.

The report summarised the consequences in 22 points, of which the following should be emphasised:

- as they currently stand, the by-passes generally increased the risk of road accidents;
- only in the case of by-passes around big cities was it possible to detect a slight improvement, but this was due mainly to the change in the road category (highway → motorway);
- it is necessary to rebuild the relieved section (e.g. traffic calming);
- special attention has to be paid to vulnerable road users (pedestrians, cyclists);
- on the sections heavily used by foreign traffic, the information system and the signs must also be clear for them;
- avoidance of the construction of “half by-passes” is advisable.

The statements of the report are supported by examples documented in detail.

The proposals drafted according to the consequences of the study can help to improve the road safety of the by-pass roads which will be constructed in the coming years.

**Key words:** traffic safety, by-pass road, road accident, traffic calming.

**Ref. number:** 212-040-1-0

**Title:** Traffic engineering analyses on sections of the road network of the county *Csongrád* for the sake of implementation of speed limits higher than 80 km/h.

**Responsible leaders:** Dr. Attila Vörös; Ms. Ágnes Polányiné Csányi.

**Commissioner:** Csongrád Megyei Állami Közútkezelő Kht.

**Consultants of the Commissioner:** Dr. Mihály Rigó; Csaba Tóth.

**Starting and finishing dates:** 10.11.2000 - 20.04.2001.

**Abstract:** The aim of the study was to acquire evidence of speed choice behaviour of drivers according to cross section and alignment parameters as well as the environment of roads on the main road network. A further goal was to point out areas for modernisation and improvement of road characteristic, where the level of service of roads could be improved. The long-term aim is to improve the road safety figures on these sections in order to increase the existing speed limit. Based on measurement of speed choice, it can be stated that drivers use speeds significantly higher than the permitted limit. A reduction in speed can only be registered in cases where their own safety is endangered.

**Key words:** differentiated speed control, traffic safety, road parameters, *Csongrád* county.

**Ref. number:** 212-041-1-1

**Title:** The expected and recommended step-by-step development of the motorway M8 and national highway № 8 by 2015.

**Responsible leader:** Ms Ágnes Polányiné Csányi; Dr. Attila Vörös.

**Commissioner:** Közép-Dunántúli Regionális Fejlesztési Tanács

**Consultant of the Commissioner:** Péter Heinrich

**Starting and finishing dates:** 15.04.2001 – 22.06. 2001

**Abstract:** With reference to the development of the motorway M8 between *Dunaiújváros* and *Veszprém* the step-by-step construction is the proper solution. Based on this solution, in connection with the construction of the *Dunaiújváros* Danube Bridge a step-by-step development of the connection between the *Dunaiújváros* Danube Bridge and *Veszprém* can be recommended using the existing road elements. In connection with this a South-Fejér county alignment as well as another alignment near to *Székesfehérvár* is under debate. A realistic solution, as a medium range investment, is the basic reconstruction of existing roads, and the construction of by-passes.

As a result of investigations the traffic shifts and the construction costs were highlighted. Based on this, a proposal was made concerning the form and order of construction.

**Key words:** motorway M8, development order, traffic shift, *Fejér* county.

**Ref. number:** 212-042-1-1

**Title:** Preparation for the negotiations with the EU, making economic analyses.

**Responsible leader:** Gábor Albert

**Commissioner:** KöViM Közlekedéspolitikai Integrációs Iroda

**Consultant of the Commissioner:** Éva Kramer

**Starting and finishing dates:** 12.06.2001 – 30.11.2001.

**Abstract:** Within the frame of the project, the Hungarian version of the questionnaire, including the enlargements, on the indices of the national courses aimed at by TEN-T, was created. After the data collection and verification from the representatives of the different modes of transport, the questionnaire was filled out, also in English, and sent to the partners.

The maps with the proposed multi-step enlargements of the TINA network of the different transport modes were carried out by frequent consultations. Basic information and demonstrating material for EU negotiations were also served frequently. The adequate translations were also provided in some cases.

**Key words:** EU accession, TEN-T, TINA.

**Ref. number:** 212-044-2-1

**Title:** Tendering of public transport services of the city of *Dombóvár*.

**Responsible leader:** Dr. Attila Vörös

**Contributors:** Dr. István Zsirai; Ms. Dr. Mária Szabó.

**Commissioner:** Dombóvár Város Önkormányzata

**Consultant of the Commissioner:** Gyula Reichert

**Starting and finishing dates:** 01.07.2001 - 31.07.2001.

**Abstract:** The city of *Dombóvár* decided to terminate the contract with *Gemenc VOLÁN Ltd.* concerning the provision of city public transport operation services. At the same time a tendering process was launched for the new public transport service contract.

Based on earlier concession tendering experiences at the Institute for Transport Sciences, concession-tendering material was compiled for the city of *Dombóvár*. This refers to the content of the tendering form, the content of the technical aspects as well as on other circumstances prescribed in the several codes.

The city of *Dombóvár* completed the tendering documents with the characteristics peculiar to the city.

**Key words:** local public transport, tendering, *Dombóvár*.

**Ref. number:** 212-045-0-1, 212-047-1-1

**Title:** Proposal for the development of the road network connections between the Heves county in Hungary and Slovakia.

**Responsible leaders:** Dr. Attila Vörös; Péter Miksztai; Ms. Éva Hingyi.

**Contributors:** László Czeglédi; Mrs. Istvánné Beszedics; Mrs. Dr. Jenőné Rimaszombati.

**Commissioner:** Heves Megyei Önkormányzat;

Földművelési és Vidékfejlesztési Minisztérium Phare CBC Iroda.

**Consultant of the Commissioner:** Zoltán Kun

**Starting and finishing dates:** 20.06.2001 – 30.08.2001.

**Abstract:** The objective of the study was to find a place for a new road axis, which can be very important for the centre of the county to reach the adjoining regions of Slovakia and the M3 motorway and the future M8 too.

Analyses were carried out of the economic and social infrastructure indicators of the area concerned (“*Tarna-valley*”), as well as of the parameters of the road network.

The analysed routes were evaluated on the basis of various criteria: traffic volume, area- and economy development effect, the feasibility of the road. The opinion of the local decision-makers was very important in the determination of the location of the road.

**Keywords:** *Tarna-valley*, route tracing, area- and economy development effect.

**Ref. number:** 212-049-1-1

**Title:** Extended measurements of velocity on the public road network as an estimation of the distribution of drivers’ speed and habits determining choice of speed.

**Responsible leader:** Gábor Albert

**Contributor:** László Czeglédi

**Commissioner:** KöViM Gépjárműközlekedési Főosztály

**Consultant of the Commissioner:** Dr. Péter Lányi

**Starting and finishing dates:** 08.2001 -04.12.2001.

**Abstract:** During the research, using *Nu-metrics Hi-Star NC-97* instruments, the measurement of speed per individual lanes was carried out at many locations on the national road network between August and October, 2001. Road characteristics and external factors influencing the drivers' choice of speed were also recorded in the areas of measurement. The three vehicle categories on which the investigations were based have been divided according to the analyses carried out during the preparation of the processing.

The classification, in compliance with the possibilities provided by most of the measuring instruments applied in Hungary, distinguishes between passenger cars, medium-sized vehicles, heavy goods vehicles (HGVs) and buses. This is essential as in this way, data resulting from similar investigations in the future will be similar to the present results and, as such, comparable and open to equal processing.

The great variety of the supporting data on the speed, recorded in different sections with different types of traffic, role, traffic volume and construction characteristics, is guaranteed by the choice of the scene and time of measuring. In the consideration of meteorological conditions, the spontaneous formation of the circumstances also played an important role.

In addition to providing documentation enabling others to analyse the data and showing the characteristics and conditions of the process of the traffic in detail, the first stage of the investigation was to check some hypotheses about choices of speed. With this it became possible to demonstrate the effect on speed change resulting from the rate of traffic, the number of lanes, wet pavement and to a certain extent the width of the shoulder of the road.

Significantly higher speeds were registered on the four-lane roads, even in their offside (slow) lane, than on two-lane-roads of a similar category; part of these effects can also be defined numerically.

The effect of the width of the shoulder and the good optical guidance by good visibility could only be proven in the case of main roads. There was no detectable significant speed difference according to the role of the roads. Nor was it possible to detect differences in speed measured on 1<sup>st</sup> and 2<sup>nd</sup> class main roads. On the secondary roads, the speeds observed were 6-8 km/h lower than on the main roads.

The results showed that the measurements were in line with expectations, and that significant effects could be proven.

Well-founded statements could help in the development of measures influencing speed, and also for the estimation of the expected results. Referring to the advantageous experience, it can be stated that it is necessary to extend the scope of the series of measurements to the choice of speed in special circumstances.

**Key words:** choice of speed, road characteristics, shoulder, optical guidance, traffic volume, road category, speed measurement, *Nu-metrics Hi-Star NC-97*, four-lane road.

**Ref. number:** 212-050-1-1

**Title:** Conditions for the implementation of advised speeds and the relevant traffic signals.

**Responsible leaders:** Dr. Attila Vörös; Ms. Ágnes Polányiné Csányi.

**Contributor:** Ms. Éva Hingyi

**Commissioner:** KöViM

**Consultant of the Commissioner:** Dr. Péter Lányi

**Starting and finishing dates:** 08.2001 – 14.12.2001.

**Abstract:** Hungarian traffic law knows only speed limit regulations. In the early 70s advised speeds were also used on Hungarian roads. This regulation was lifted many years ago. This practice is still used, however, in some neighbouring countries as well as in some countries of the EU.

In the framework of this study the form, extent and regulations in international practice were analysed.

Furthermore, the traffic engineering situations in which the use of advised speed regulation can be implemented were listed and investigated. A recommendation was worked out concerning

the traffic signs and information boards with short texts. The study also gave recommendations on differentiated use.

**Key words:** speed regulation, advised speed, modification of traffic rules.

**Ref. number:** 212-051-2-1

**Title:** Feasibility study on the establishment of an up-to-date and efficient PMS and – maintenance system for the main road network governed by the capital, *Budapest*.

**Responsible leaders:** Dr. Attila Vörös; Gábor Albert.

**Commissioner:** Budapest Főváros Önkormányzata Főpolgármesteri Hivatal, Közlekedési Ügyosztály

**Consultant of the Commissioner:** Zsófia Konyári

**Starting and finishing dates:** 08.2001 – 10.12.2001.

**Abstract:** At the initiative of the Local Authority of Budapest, numerous scientific design institutes and companies – led by KTI Ltd – made a proposal that the basic preparatory calculations of the Budapest PMS should be up-dated, and accordingly prepared a feasibility study of the PMS and maintenance systems.

In this project the present methods applied in the field, their advantages and shortcomings, and also the possibilities for further development were taken into consideration. The team of experts/professionals who carried out the project proposed that the programme-network HDM III (developed by the World Bank) should be applied as a foundation for the reconstruction works, its strategies, sequence, date etc. in the case of Budapest's main-, and later its secondary road network.

The HDM III PMS provides its users, professional and political decision-makers, with the following possibilities:

- In cases of a given budget for one or more years the software system provides optimal, system-efficient use of the money available.
- It is possible to calculate the cost of a given reconstruction programme and make necessary decisions.
- The optimal order and the investment schedule can also be calculated in cases of general application of a type of operation.
- The software provides the order and cost of maintenance to be carried out dependent on the general and particular deterioration of the road network to be maintained.

On the basis of the HDM III programme system a professional, efficient, comprehensive and transparent PMS, which will provide the optimal allocation of the different resources, can be created.

During the preparatory analyses it became clear that the HDM III had to be completed by special aspects, software segments and extra calculations reflecting some peculiarities of the capital.

The HDM IV programme-system, which will be available within 3 years, could be of great assistance, as it will already contain the greatest part of the complementary indices, information and calculations necessary.

**Key words:** PMS, urban road network, road maintenance, *Budapest*.

**Ref. number:** 212-053-2-1

**Title:** Determination of the annual mileage of Hungarian road motor vehicles, differentiated by location, time and categories.

**Responsible leader:** Ms. Éva Hingyi

**Countributors:** Dr. Attila Vörös; Péter Miksztai; László Czeglédi; Mrs. Istvánné Beszedics; Mrs. Dr. Jenőné Rimaszombati.

**Commissioner:** ÁKMI Kht.



**Consultants of the Commissioner:** Dr. András Gulyás; Gábor Thurzó.

**Starting and finishing dates:** 22.08.2001 – 20.03.2002.

**Abstract:** There are currently significant differences between the figures of annual vehicle mileage calculated from traffic counts and from other surveys by transport professionals, statisticians or sociologists, in particular in the case of cars. Therefore it is an unavoidable task to determine the differentiated and accurate figures for the reliable calculation both of the real traffic load of the road network and of the vehicle running costs. The expected deadline of the project is June 2002.

**Key words:** annual mileage.

**Ref. number:** 212-055-2-1

**Title:** Examination of the road traffic realignment due to the opening of the new Danube-bridge at *Szekszárd*, with special regard to the complex efficiency of the different road network development solutions as well as the opening phases.

**Responsible leaders:** Dr. Attila Vörös; Ms. Éva Hingyi.

**Contributors:** Gábor Albert; Péter Miksztai; Mrs. Istvánné Beszedics; Mrs. Dr. Jenőné Rimaszombati.

**Commissioner:** UKIG

**Consultant of the Commissioner:** Ms. Mária Hamarné Szabó

**Starting and finishing dates:** 15.09.2001 – 31.03.2002.

**Abstract:**

The project examines the Danube-bridge at *Szekszárd*, as well as the future M9 expressway with the connecting road network. In the study, different stages of the development of the network are envisaged and examined. The expected realignment of the traffic in the different network variants are determined with the EMME/2 software. The social, economic and area development plans and their impacts on the traffic volume are also taken into consideration.

The complex efficiency analysis will be carried out by the algorithms developed earlier by the same research team. The project will be finished in the first half of 2002.

**Key words:** Danube-bridge at *Szekszárd*, examination of traffic realignment, EMME/2, efficiency analysis.

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## **GÖRGÉNYI Ágnes Ms.**

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## **HOLLÓ Péter Dr.**

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## **KUNA Erzsébet Ms.**

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### **MÉSZÁROS-KIS Ágnes Mrs.**

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### **MERÉTEI Tamás Dr.**

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### **NÓGRÁDI Béla**

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### **TREPPER Endréné Mrs.**

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### **ZSIRAI István Dr.**

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## **Abbreviations**

ÁKMI

BM

KHVM

KöM

KöViM

UKIG