

*INSTITUTE FOR TRANSPORT SCIENCES*

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## **Annual Report 2003**

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## Foreword

May 1<sup>st</sup> 2004 saw Hungary arrive at an important and successful stage in the socio-economic transformation and return to a market economy. From this day on our country is a full member state of the European Union. Hungary's membership of the European Union means both a new impetus and, at the same time, constraint, which have placed the development of the Hungarian economy and transport at the centre of public opinion and the business sphere.

Transport links our country to the global economy and to the very heart of Europe; at the same time this also creates the basic conditions for the satisfaction of three of the four basic principles of the European Union: freedom of movement of people, goods and services.

A prosperous society and dynamic development of industrial and trading relations are indispensable foundations for a developed transport infrastructure. It is an important goal of Hungarian economic policy that the economy should operate as a competitive economy, guided by scientific knowledge based on results achieved through the country's historical traditions of science and research and development. The development of transport has a particularly significant role to play in the area of competition. The geographical situation of Hungary offers a good opportunity to strengthen our role in the areas of trade, logistics and tourism, provided that transport is efficient and the climate attractive to investors.

Armed with this knowledge, the ministry prepared the new Hungarian transport policy, valid until 2015, which was accepted by parliamentary resolution in March 2004. The aim of the Hungarian transport policy is to create a transport system which promotes sustainable development and at the same time is economically viable, meets the demands of society, is modern and safe and places less of a burden on the environment.

The law drafted last year on the development and public utilisation of high speed roads makes it possible for Hungary to speed up the building of motorways and highways, and to reduce the regional inequalities in the country, thus making areas which were at a disadvantage up until now more attractive from the point of view of investment.

The reform of the railways, the development and modernisation of air and water transport, and the establishment of logistics systems and centres supporting inter-modal transport all fall under the jurisdiction of the department of transport, thus researchers in the transport sector are facing a significant challenge.

Hungary, and in particular the transport sector, is keen to participate in the realisation of the Lisbon and Barcelona objectives of the European Council, whereby, founded on a solid knowledge base, the European Union would become the most competitive economic area in the world by 2010.

The law drafted in 2003 relating to the establishment of a basis for innovation will provide opportunities for the improvement of domestic research and development. The ministry elaborated and accepted a medium-term strategic plan for the development of the Institute for Transport Sciences, transforming the institute into a non-profit organisation in line with European Union practice. In its work on regulations and decision-making, the ministry is much happier to use modern and scientifically proven research results and fresh knowledge. In addition to achieving domestic results for proven traffic science projects, it is extremely important to speed up the technical transfer for the receiving of such results.

The European Union will provide enlarged markets and additional development sources, all of which means a good chance for growth in transport, scientific knowledge and the economy as a whole.

Budapest, May 1<sup>st</sup> 2004.

**Dr. István Csillag**

Minister of Economy and Transport

## **KTI introduction**

The Institute for Transport Sciences has been publishing a summary of its most significant research and development results in its annual yearbook for many decades. The 2003 edition, however, can boast a number of special features.

The staff of the institute are very proud of the fact that the foreword to the yearbook was signed by the Minister of the Economy and Transport (the Ministry which owns the institute) on the very day on which Hungary became a full member of the European Union. The research results published in this edition were conceived outside the Union, but the publishing of the book will actually take place in the Union.

The institute achieved the results appearing in the yearbook while still operating as a joint stock company, but the book will be published with the institute operating as a non-profit research centre, the format generally found within the Union. The change in company format was effected by parliamentary resolution № 2338/2003 (XII.23.).

In preparation for full accession to the European Union, the management of the institute, together with expert delegates from the ministries responsible for and affected by transport research (Office of the Prime Minister, Ministry of Economy and Transport, Ministry of Education), studied the corporate formats, management mechanisms and operating conditions of the national transport institutes of several other countries. Based on the results of the study of the research institutes in the Czech Republic (CDV), Finland (VTT), France (INRETS, SETRA), the Netherlands (AVV), Poland (IBDiM), Germany (BASt) and Sweden (VTI), the institute, under the direction of the Minister for the economy and transport, elaborated a plan for the medium-term strategic development of the institute, covering the period from 2004 to 2006. Part of the development plan was begun in 2003 with the preparation for the transformation of the institute into a non-profit organisation. In this format, KTI can join the list of institutions in the Union operating as budgetary or non-profit organisations.

As part of the strategic plan, the institute re-defined its mission statement, and, based on the international relations built over many decades, is now striving to integrate more thoroughly into the system of institutions of the European Research Zone.

### **Vision**

The Hungarian transport system forms an integral part of the transport network of the enlarged European Union:

- it is safe,
- it is efficient and competitive,
- it promotes sustainable development at both national and Union level.

## **Mission statement**

The scientific activities of the KTI help it achieve the following:

- improvement in technical, economic and social knowledge with regard to transport,
- improvements in transport safety and environmental protection,
- contributions to the welfare of present and future generations.

## **Strategic aims**

- To facilitate, through research and development, data analysis and other professional activities, the forming of a scientific basis for decision-making for the Parliamentary and Governmental transport departments, and to contribute significantly to the subsequent realisation of such decisions.
- To become an integral part of the system of transport research networks of the European Research Zone. To facilitate at national level the realisation of the goals with regard to competition and knowledge base drawn up in the Lisbon and Barcelona resolutions of the European Council.
- To maintain its position as domestic market-leader in its main sphere of activities, and to reinforce the multidisciplinary nature of the research in transport, paying particular attention to the scientific basis and realisation of Hungarian transport policy.

## **History**

The first predecessor of the KTI was established in 1938 by the minister for trade and transport affairs, under the name of the National Automobile Experimental Station. Several decades later studies, measurements and inspections of roads and bridges were added to the purely technical vehicle profile. Since then the activities covered by the institute have grown continually and now include such specialist areas as transport safety, traffic technology, transport policy, environmental protection, passenger and goods transportation, transport by water and air, network planning and transport economics. The institute has operated under several different corporate formats since its establishment; it was a budgeted research centre as part of a corporate management system, and from 1993-2003 operated as a joint stock company. In all cases, though, it has remained in state ownership.

After a study of the company and management formats of the national research institutes of the European Union, the Government of the Republic of Hungary passed resolution № 2338/2003 (XII.23) transforming the KTI into a non-profit company with effect from January 1<sup>st</sup> 2004. Ownership rights over the institute are controlled by the Minister for the economy and transport.

Although the KTI pays considerable attention to technological, economic and market-oriented views during its research and development services, the responsibility felt towards the health of society and the environment exceeds other criteria. Bearing this in mind, creativity, trustworthiness, professionalism, an independent personality and the ability to work in a team are considered to be important personal qualities by the KTI staff. Professionally, the strengths of the institute include its diversity, modern databases covering a wide time span, and competitive prices.

## The main areas of research and development of the institute

*Road matters, road and bridge management:* development of road building and maintenance technologies, measurement and inspections, concrete and asphalt technologies, road and bridge management systems.

*Vehicle operation and maintenance:* elaboration of the procedures for the operation of energy-saving vehicles, preparation of new tools for diagnostics and technical regulations and harmonisation of EU regulations.

*Environmental protection:* efficiency inspections of environmental protection, alternative combustible materials, new procedures for the reduction of air and noise pollution, inspection of environmental protection models.

*Transport safety, traffic engineering:* development of transport projects, research into causes of accidents, safety aspects in connection with vehicles, people and transport projects, and preparation of the legal rules and regulations regarding transport safety.

*Network planning:* traffic censuses and analysis, elaboration of alternative plans for the development of national, regional and municipal transport networks, development of methods for the improvement and evaluation of networks.

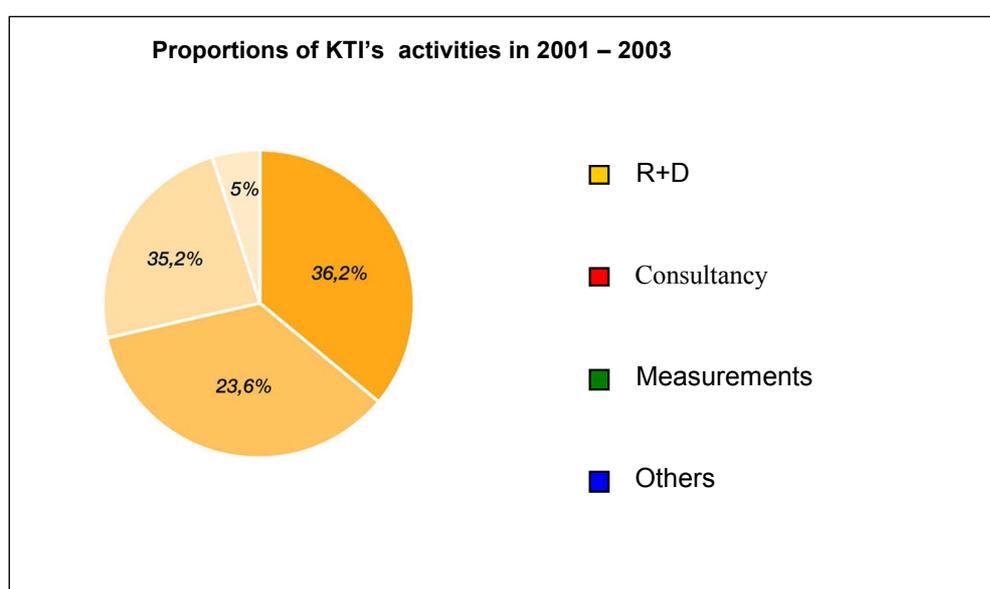
*Transport by water and air:* inspection of transportation results, analysis and prognosis of port and airport traffic, foundation of strategies for the development of sub-sectors.

*Public transport, transport in cities:* passenger transport censuses, mid- and long-term development plans, development of concession systems, public transport systems in cities.

*Logistics-goods transportation:* development of transportation and distribution networks, planning of national logistics centres, combined transport, city logistics, databases of goods traffic.

*Transport economics:* the relationship between transport and society, division of labour within transport, tariffing policy, regulation, market analyses, transport policy.

*Organisation of research:* assistance and co-ordination of co-operation in domestic and international research, preparation of tenders.



## International relations

KTI has developed a wide range of international relations, and is a member of the European Conference of Transport Research Institutes (ECTRI), the Forum of European National Highway Research Laboratories (FEHRL) and the Forum of European Road Safety Research Institutes (FERSI). Our colleagues participate as national experts in various bodies, including the European Conference of Ministers of Transport (ECMT), the technical commission of the European Commission, the ENSZ EGB WP.1, WP.5, WP.29 working groups, and the European Road Transport Research Advisory Council (ERTRAC).

The institute operates the office for Hungarian transport matters in connection with a wide range of EU research, and carries out the co-ordination of the realisation of the intelligent transport passenger information system (RDS-TMC) in central and eastern Europe, and runs the EU-UN ECE Highway Technical Vehicle Co-ordination Centre. The institute is a member of the World Road Association (AIPCR-PIARC), and as a member provides data for the International Transport Research Documentation (ITRD), and is a member of the International Road Traffic and Accident Database (IRTAD).

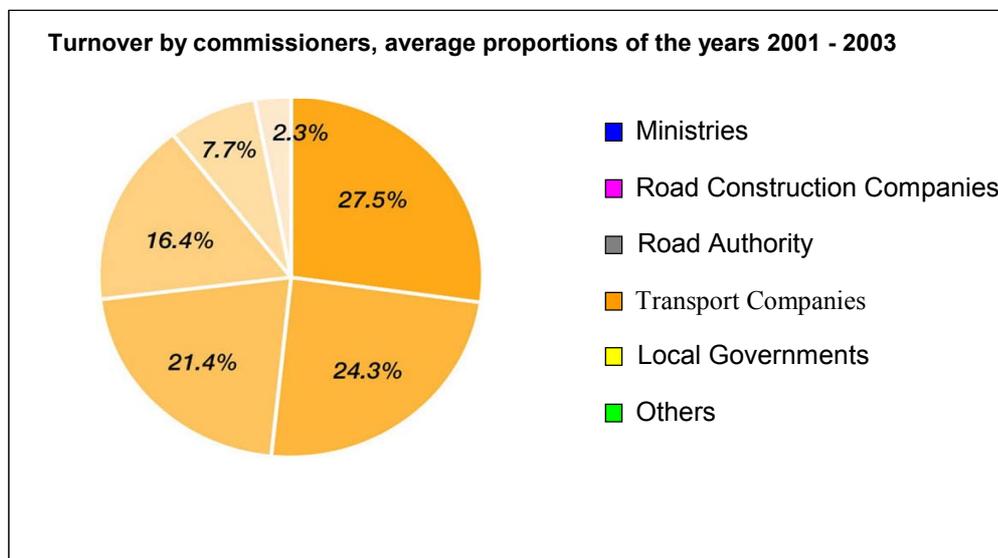
The institute has carried out numerous international tasks commissioned by various companies, and has realised many successful projects under the COST, EUREKA, EU shell. The most significant KTI projects within the sphere of the EU IV-VI shell programmes are as follows: ALSO-DANUBE, AMADEUS, ARTEMIS, CODE-TEN, COMPRIS, DESIRE, FORMAT, IN-SAFETY, LIFETIME, NR2C, PARIS, RIPCORN, ROSEBUD, SCENES, SCENARIO, SUNFLOWER-6.

## Resources, market characteristics

KTI has at its disposal an experienced and highly trained team of researchers, with 170 full-time staff at the end of December 2003. The institute can boast among its staff two qualified professors, and another 13 people with PhDs and university doctorates.

KTI is qualified to provide scientific training in the fields of transport science and transport building.

KTI satisfies the demands of a wide range of local and foreign clients with its scientific and professional activities.



The average net annual turnover exceeds one billion Hungarian forints.  
The national specialist public library offers professionals in the field some 60 000 books as well as a huge number of professional documents on both the theories and practicalities of transport.  
KTI has six accredited laboratories, and since 1999 has continuously renewed its ISO 9001 order regarding quality and its ISO 14001 on the environment.

\* \* \*

The original predecessor of KTI established strong international relations. In addition to the measuring equipment developed domestically, a significant amount of the equipment in the laboratories consisted of German and English appliances. The majority of the books and documents available in the library at that time were German. During the first decades of its existence, the institute acquired its mechanical vehicle engineers from famous local and foreign car manufacturers, and the experts in the organisation of transport gained their shipping and logistics experience in the ports of Rotterdam, Amsterdam, Hamburg and New York.

The international relations established in the recent past, together with the local client base have filled the staff of the institute with the hope that they can be a useful and successful member of the European Union.

**Dr. László Ruppert**

Managing Director



## Editor's notes

The current edition details the most significant research work carried out by the institute in 2003. The chapters are arranged by KTI research divisions, in alphabetical order.

A list of books, CD-ROMs, scientific articles, lectures and presentations by KTI's researchers can be found in the *Bibliography* at the end of the publication; this gives a clear insight into the professional fields of interest of the researchers and the tendencies in the institute's research work, as well as the demands of those who commission work from the institute.

The *Name Index* contains references of the responsible leaders, and the names of the authors of books, CD-ROMs, articles and lectures.

Librarianship practices established earlier by the Documentation and Information Centre of KTI were followed while compiling the *Subject Index*: free-style keywords are assigned to the annotated research reports, and, in addition to drawing on our own technical experience, great attention is paid to the principles of the key word system of the *TRANSPORT CD* issued by *OVID* (earlier *SilverPlatter*).

A *List of Employees* at the end of the publication provides names of KTI's associates as on 31 December 2003, paying a tribute of recognition to the co-operation and joint effort of the whole staff that makes our achievements possible.

We would be delighted to receive the opinions, comments and suggestions of our readers, so that we may take these into consideration during the preparation of the next edition.

Budapest, May 1<sup>st</sup>, 2004.

Dr. Mihály FÜREDI

Librarian



## SELECTED RESEARCH TOPICS

### COMPLETED IN 2003

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

**Ref. number:** 273-717-1-3

**Title:** Economic and technical analysis of the possibility of using a chip-card with basic data on the technical and environment tests necessary for vehicle identification, and the results of the periodic technical inspections of vehicles.

**Responsible leader:** Attila Tóth

**Commissioner:** Közlekedési Főfelügyelet

**Consultant of the Commissioner:** László Török

**Starting and finishing dates:** 01.07.2003 – 05.12.2003.

**Abstract:** The increasing number of vehicles and the enormous quantity of data which have to be recorded, together with the tendency to be observed in the EU, whereby paper documents will be replaced by plastic cards, made it necessary to consider the possibility of the introduction of a modern card-form document for the registration of vehicles.

Since such a card form must contain the integrated data of several documents, we considered the possible application of a document also containing an electronic data carrier. Through the economic and technical analyses of the potential card-types, the theoretic basis has been created for the introduction of a chip-card holding not only the basic data necessary for the identification and the technical and environmental tests of the vehicles, but also the results of the periodic technical inspections. The study also presented the possibilities of distance related road pricing, and the role of electronic cards in this field. All particulars were given of the variant considered to be the most appropriate, being easy to handle, imitation-resistant, and most efficient (chip-card personified with laser-engraving), together with the elements of the service system of operation.

**Key words:** chip-card, motorway toll, electronic document.

**Ref. number:** 273-727-1-3

**Title:** Analysis of EC Directives 96/96/EC and 2003/30/EC in order to maintain harmonisation in technical regulation of road vehicles, with relevance to individual vehicle inspections.

**Responsible leader:** József Dabi

**Commissioner:** GKM Közúti Közlekedési Főosztály

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 17.11.2003 – 15.12.2003.

**Abstract:** The relevant EU directives have been continuously analysed and processed in order to harmonise the statutory Hungarian technical rules on vehicles. Directive 96/96/EC on periodic technical inspections, as amended by Directives 2002/85/EC and 2003/30/EC, and Directive 2000/30/EC, as amended by Directive 2003/26/EC have been checked from professional aspects. The relevant regulations and annexes of KöHÉM orders 5/1990.(IV.12.) (ER), and 6/1990.(IV.12.) (MR) are also affected by the amendments.

According to Directive 2002/85/EC, speed limiting devices should be installed in further motor vehicle categories (in the case of categories M2 and M3, the vehicles of 5-10 tons gross vehicle weight). This modification requires the amendment of Article 93/A of the MR referred to above. Directive 2003/26/EC, which modifies Annexe 5 of the MR, provides for new permissible limit values for the pollutants emitted by motor vehicle exhaust gases.

The permissible value of the pollutant content of exhaust gases produced within the framework of road control is adjusted by Directive 2003/26/EC to the limit values prescribed by Directive 2003/27/EC. The change requires the modification of Annexe 10 to the ER.

During the project the new provisions of the directives were collated with the present national regulation and the proper UN/ECE regulations; the methods for adjusting the legislature were examined, and orders elaborated.

**Key words:** motor vehicle operation, periodic technical inspection of vehicles, harmonisation, road safety.

**Ref. number:** 273-730-1-3

**Title:** Development of the possibilities for control offered by up-to-date motor vehicle installations and on-board equipment to be used in periodic technical inspections, taking into consideration the practice in the EU member states.

**Responsible leader:** József Dabi

**Commissioner:** GKM Közlekedési Főosztály

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 17.11.2003 – 15.12.2003.

**Abstract:** The study explored the surveying possibilities offered by the environmentally important OBD (on-board diagnostic) system, which can regulate and control the pollutant content of exhaust gases and by the digital tachograph, which is essential for road safety reasons.

The OBD is a diagnostic system used to control the appropriate operation of the elements regulating the emission of pollutants; when an error occurs in the operation, the system indicates the location of the error by attributing the necessary error code.

The study briefly presents the tasks of the OBD system, from the aspects of the supervision of the state of the elements participating in the emission of the engines of different operation systems. The method of signalling errors occurring in the regulating-controlling system has been presented, as have the possibilities for the evaluation of motor vehicle emissions within the framework of the periodic inspection on the basis of errors signalled by the diagnostic system. Technical developments mean that a digital unit capable of storing the relevant information, and a digital tachograph using a driver's personal card (thus eliminating the abuses experienced with the type of tachographs currently used) have appeared. In the near future we should be prepared for the wide spread application of tachographs equipped with digital memory cards and for these to be checked within the framework of the periodic inspection.

The study described the structural and functional requirements on digital tachographs and tachograph cards and a proposal was made for the implementation of checks within the framework of the periodic inspection. However, digital tachographs imply changes in the future not only in the periodic inspections; the handling of the memory cards will require the introduction of a significant official registration system.

**Key words:** periodic technical inspection of vehicles, international road transport of passengers and goods, vehicle tests, road safety.

**Ref. number:** 273-731-1-3

**Title:** EU accession related development of road vehicle control systems at the national border crossing points, bearing in mind EU practice.

**Responsible leader:** József Dabi

**Commissioner:** GKM Közúti Közlekedési Főosztály

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 17.11.2003 – 15.12.2003.

**Abstract:** The EU and national practices of border controls of road vehicles engaged in international traffic and exceeding a total mass of 3.5 tonnes at the exit points of the “Schengen” border were explored and analysed. On the basis of the analysis and the information gathered on the controls actually carried out by border-guards and customs officers, and the transport inspectorate, a proposal was prepared for the elaboration of a technical control system for vehicles on the crossing points of the outer border sections.

International agreements and national provisions on vehicles engaged in international road transport have been elaborated from the aspect of control, and a proposal on the subject of technical control of vehicles at border crossings has been prepared.

**Key words:** periodic technical inspection of vehicles, international road transport of passengers and goods, vehicle tests, road safety.

**Ref. number:** 273-732-1-3

**Title:** Elaboration of official data collection and analysis of activities related to official inspection of tachographs used to control the driving and resting times of motor vehicle drivers, and determination of the data processing system.

**Responsible leader:** László Faragó

**Commissioner:** GKM Közúti Közlekedési Főosztály

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 17.11.2003 – 15.12.2003.

**Abstract:** Within this study, those official road controlling responsibilities and their legislative background which should be implemented within the framework of the periodic technical inspections, and road and company site controls have been considered from the aspect of data collection. Official tasks connected to tachograph controls are also extended to the authorisation of the relevant servicing activities.

From the aspect of data collection, the checking activities to be carried out during the different official vehicle tests on tachographs, as well as the mode of detection of possible errors (using also the provided code list of errors of the periodic inspection) have been specified.

Although slight differences exist, the content elements of data collection performed in the course of periodic inspection and road controls are basically the same. The difference is only due to the deficiency of the necessary technical conditions of the road control of some inspections.

A proposal was prepared regarding the content of the data-sheet, and the point of view of data-analysis in accordance with the tasks of the road authority; the data processing system was also determined.

**Key words:** tachograph, periodic technical inspection of vehicles, road safety.

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

**Ref. number:** 252-075-2-3

**Title:** National, regional and local emission inventory of road, rail, air and inland waterway transport for the year 2001.

**Responsible leader:** Dr. Tamás Merétei

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

**Commissioner:** KVVM

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

**Starting and finishing dates:** 03.07.2003 – 30.09.2003.

**Abstract:** The emission inventory for the moving sources of the Hungarian transport sub-sectors was determined for the year 2001. In this way, calculations were made for the quantities of most important pollutants (CO, HC, NO<sub>2</sub>, SO<sub>2</sub>, Pb, particulates and CO<sub>2</sub>) emitted in the exhaust gases of the engines of the road, rail, air- and waterway vehicles. The emissions of air polluting substances were computed for the total territory of Hungary, for each county and county-seat, as well as for each 20×20 km land area.

In the case of road transport the calculation of the emission inventory was based on the data of traffic volume, the specific emission coefficients of the different vehicle categories (passenger car, bus, truck) and the total length of the road network in the area of land in question. In the case of rail transport the following data were taken as the basis for the calculation: diesel-traction train traffic, the length of the rail network and the average specific emissions of diesel engines. For air transport only Ferihegy Airport was taken into consideration, and in this case the emissions were calculated on the basis of the LTO-cycle (landing, rolling in/out, taking off); i.e. the basis was the number of take-offs and the average specific emission values of the aircrafts using the airport. With regard to waterway transport the ship traffic on the Danube and Tisza rivers and Lake Balaton, together with the length of these waterways were used for the calculation. Separate emissions calculations were made for goods and passenger waterway transport, based on fuel consumption and specific emission values of the ships, and the results were then included in one summarised version. The table below shows the emissions of transport for the year 2001, according to the various sub-sectors.

	[tonnes/year]						
Air polluting emissions of sub-sectors of transport	CO	CH	NO <sub>2</sub>	SO <sub>2</sub>	Pb	Particulates	CO <sub>2</sub>
Road transport	420137.00	57294.00	101065.00	1036.00	0.00	20037.00	10219103.00
Rail transport	1040.00	332.00	4651.00	339.00	0.00	50.60	218560.00
Air traffic	133.40	96.58	269.20	23.86	0.00	10.54	75141.00
Waterway transport	2390.30	1673.20	6952.60	191.20	0.00	518.6	400109.00
Totals	423700.70	59395.78	112937.80	1590.06	0.00	20616.74	10912913.00

It can be seen quite clearly that road transport plays a significant role in all categories. The following conclusions can be drawn from a comparison of these figures with those of the year 2000: the CO and HC emissions have decreased, whereas the NO<sub>2</sub>, particulate, and CO<sub>2</sub> emissions have risen slightly.

**Key words:** air pollution, environmental protection, emission inventory, emission factors, transport.

**Ref. number:** 252-093-1-3

**Title:** Conditions for the fulfilment of governmental obligations laid down by European Union Directive 2003/30/EC. Promotion of the use of bio-fuels in the field of road transport.

**Responsible leader:** Dr. Tamás Merétei

**Commissioner:** GKM – Ministry of Economy and Transport

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

**Starting and finishing dates:** 01.09.2003 – 15.12.2002.

**Abstract:** Directive 2003/30/EC of the European Parliament and the Council of the European Union dated 8<sup>th</sup> May 2003 on the promotion of the use of bio-fuels or other renewable fuels for transport laid down the following: a minimum 2 % proportion of biofuels calculated on the basis of energy content of all petrol and diesel for transport purposes shall be achieved by 31.12.2005, rising to 5.75% by 31.12.2010. Taking into consideration the fact that the heating value of the bio-fuels produced from biomass (bio-alcohols, vegetable oils) is less than that of the crude oil based petrol or Diesel fuel, their share with regard to volume will be bigger. This report summarised the tasks related to the fulfilment of targets set down in the Directive in the case of Hungary. Strategies and programmes for the achievement of the large scale introduction of bio-fuels have been proposed. There is a comprehensive survey regarding the physical and chemical characteristics of the production processes, environmental effects and experiences of the applications of bio-petrol and bio-diesel. The collected knowledge and proposals for the domestic application form a basis for the technical –and economic decisions to be elaborated in the near future in the field of the operation of road vehicles, the petroleum refining industry, and agriculture.

**Key words:** bio-fuel, alternative fuel, environmental policy, energetics, harmonisation.

**Ref. number:** 252-086-1-3

**Title:** The role and representation of Hungary in the regulatory work carried out in the UN ECE working groups on the environment of the World Forum for Harmonisation of Vehicle Regulations (WP.29); participation in the elaboration of the UN ECE regulations.

**Responsible leader:** Iván Pollák

**Commissioner:** GKM

**Consultant of the Commissioner:** Péter Barna

**Starting and finishing dates:** 10.01.2003 – 20.01.2004

**Abstract:** We Participated in three meetings of the Economic Commission for Europe; Inland Transport Committee; World Forum for Harmonisation of Vehicle Regulations (WP.29); Working Party on Pollution and Energy (GRPE):

- №45 held between January 13<sup>th</sup> and 17<sup>th</sup> 2003,
- №46 held between May 19<sup>th</sup> and 23<sup>rd</sup> 2003,
- №47 held between January 12<sup>th</sup> and 16<sup>th</sup> 2004.

and in the discussions of the *ad hoc* group on

- World-wide heavy-duty certification procedure (WHDC)
- Development of a world wide motorcycle emission test cycle (WMTC)
- GRPE Particle Measurement Programme (PMP)
- GRPE working group on Off-Cycle emissions (Off-Cycle)
- GRPE working group on World-Wide harmonised Heavy-duty On-Board Diagnostics (WWH-OBD)
- GRPE working group on the emissions from Non-Road Mobile Machinery (NRMM)
- GRPE working group on Hydrogen and Fuel Cell Vehicles (HFCV)

In some topics so-called “world harmonised” Global Technical Regulation (GTR) are being developed under the leadership of representatives of such countries as USA, Japan and European Union member states.

During the last year some of the proposals for new technical regulations reached their final phases.

A proposal was submitted for the development of a Global Technical Regulation concerning heavy duty vehicle exhaust – emissions type – approval (certification procedure (WHDC) to be developed under the 1998 Geneva Agreement. This proposal was based on UN/ECE regulation №49 as well as on the modified version of the 88/77/EC directive.

The proposed regulation will be based on new research into the worldwide pattern of real heavy commercial vehicle use. From the collected data, two representative test cycles, one transient test cycle (WHTC) and one steady state test cycle (WHSC), have been created covering typical driving conditions in the European Union, the United States of America and Japan. Based on real life data a gearshift model was developed to translate the vehicle cycle into an engine cycle. The general laboratory conditions for the emission test and the engine family concept have been brought up to date by expert committees in ISO and now reflect the latest technologies.

The WHTC and WHSC test procedures reflect world-wide on-road heavy-duty engine operation as closely as possible and provide a marked improvement in the realism of the test procedure for the measurement of the emission performance of existing and future heavy-duty engines.

The performance levels to be achieved in the GTR will be discussed after validation of the proposed test cycle and procedure.

The series of WHSC test bench measurements performed at the KTI analyse the effect of the new test cycle and the various existing ones compared with the calculated, weighted emission levels.

The table below indicates the most important emission parameters according to the different test cycles.

Regulations	NO <sub>x</sub> g/kWh	CO g/kWh	HC g/kWh	PT g/kWh
I № 96	5.55	1.42	0.22	0.1401
I ESC	5.95	1.11	0.21	0.1034
I № 49	5.823	2.029	0.305	0.1186
I WHSC	8.10	1.99	0.30	0.0724
II WHSC	7.43	-	0.25	0.1024
II ESC	5.84	1.41	0.25	0.1096

**Keywords:** international regulations, environmental protection, air pollution caused by traffic.

**Ref. number:** 252-078-2-3

**Title:** Survey of air pollution and noise levels in settlements in conflict situations as a result of the introduction of motorway tolls.

**Responsible leader:** József Kis

**Contributors:** Dr. Tamás Merétei; János Jaksa; István Antal; Mrs. Jánosné Kiss; Mrs. Dr. Béláné Vaskövi.

**Commissioner:** KVVM

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

**Starting and finishing dates:** 18.06.2003 – 30.09.2003

**Abstract:** The introduction of tolls on the existing, and previously toll free highways caused serious environmental pollution in areas around the main roads running parallel with these highways due to the increase in the volume of traffic. A significant part of this network of main roads goes through densely populated areas. The results of measurements of air pollution taken

in built-up areas in the vicinity of these roads have shown that the air quality is fundamentally influenced by the harmful emissions of road vehicles.

On the basis of the conclusions mentioned above the objectives of this project can be summarised as follows: An evaluation of the effect of the introduction from January 2003 of motorway tolls on the M7 motorway (which was renewed in the year 2002) on settlements in the vicinity of main road №7 because of changes in road traffic volume.

Evaluation of the use of the 4-day motorway-ticket, which was introduced to reduce the amount of traffic re-diverting to main road №7.

The effect of the introduction of motorway tolls was evaluated on the basis of a comparison of the results of air pollution measurements taken in the same period in 2002, and in 2003 prior to the 4-day ticket.

The effect of the introduction of the 4-day ticket for motorways was evaluated by air pollution measurements taken near main road №7 on the territory of the city of Siófok, as well as by traffic counts. As average concentrations of air polluting substances NO<sub>2</sub> and BTX (benzene – toluene-xylene) were measured, the sampling time was one week, while NO<sub>2</sub> and benzene emissions were calculated on the basis of traffic volume, specific emission factors and average speed.

On the basis of the air pollution measurements and the emission calculations, the following conclusions can be drawn: the air pollution increased as a result of the introduction of motorway tolls, but the measured concentrations of NO<sub>2</sub> and benzene were always below the limit values; air pollution in the investigated settlement was in the same range.

The change in the volume of traffic from the motorway to main road №7 didn't increase during the tourist season as a result of the introduction of the 4-day motorway ticket.

**Keywords:** toll on motorways, emissions of road vehicles, air pollution.

## ***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] in 2003.

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

**Contributors:** Lilian Bogdán; Dr. Jenő Bodolay; Tibor Jakab (also as reader); Mrs. Jenőné Katona; György Pártos; Tamás Radóczy; Dr. László Reznák; Dr. Dezső Rósa; Dr. Ervin Szentes; Dr. Boldizsár Vásárhelyi; Dr. István Zeley.

**Commissioner:** ÁKMI Kht.

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

**Starting and finishing dates:** 01.01.2003 – 30.06.2003.

**Abstract:** During the past year the quarterly Hungarian language professional journal *Útügyi Szakirodalmi Tájékoztató* was only published on 2 occasions, with a total of 373 annotated items on 329 published 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 could 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 reference journal.

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

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

**Title:** A selected bibliography of the Hungarian professional literature on bridges, viaducts and tunnels from the beginnings until 30<sup>th</sup> June 2002.

**Responsible leaders:** Dr. Pál Boros; Dr. Mihály Füredi (also as programmer).

**Contributors:** Ms. Lilian Bogdán; Mrs. Lászlóné Igari; Ms. Erika Simon.

**Commissioners:** UKIG – ÁKMI Kht.

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

**Starting and finishing dates:** 01.01.2003 – 30.11.2003.

**Abstract:** This thematic bibliography contains articles, books, standards, dissertations and small publications in Hungarian on bridges, viaducts and tunnels published between July 1<sup>st</sup> 2002 and June 30<sup>th</sup> 2003.

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

The final product was published on paper. At the end of the thematic bibliography there is a name index, a very detailed and professionally elaborated keyword index, a list of the periodicals and journals processed, and a list of abbreviations used. The bibliography consists of 55 pages in A/4 format, and was published in 100 copies. The electronic, database version of the whole thematic bibliography can be used at the KTI Library, and, with its well-known user friendly *MicroISIS* tools, can satisfy all professional needs.

**Keywords:** publishing, information dissemination, bibliography, bridge, tunnel, viaduct, culverts, database, database handling, *MicroISIS* software.

## ***Environmental Protection and Acoustics Division***

**Ref. number:** 250-008-2-2

**Title:** Preliminary environmental effect analysis – Szeged Regional Airport.

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

**Commissioner:** Szeged Megyei Jogú Város Polgármesteri Hivatal

**Consultant of the Commissioner:** Ferenc Miskolczi

**Starting and finishing dates:** 01.04.2002 – 30.04.2003.

**Abstract:** The task was to perform a preliminary environmental effect analysis of the finalisation of Szeged Airport and to set out noise protection areas. The environmental effect analysis showed that flight noise appearing due to the improvements will not result in a noise load higher than the permitted level. Development of the airport will not impose any significant direct or indirect effects on surrounding settlements, though some small increase on the burden on the environment's fauna can be expected.

**Keywords:** traffic noise, noise protection area, aircraft noise emission, environmental protection, environmental effect analysis, protection of fauna.

**Ref. number:** 250-030-2-3

**Title:** EU compliant revision of railway noise measurement and calculation standards.

**Responsible leaders:** Sándor Hajdú

**Commissioner:** KAC sponsorship – KVVM

**Starting and finishing dates:** 10.03.2003 – 30.06.2003.

**Abstract:** Guideline 2002/49/EC (25 June 2002) of the European Parliament and Council on “evaluation and treatment of environmental noise” requires official Hungarian standards on determining railway noise effects to be modernised to meet current EU requirements. This requirement affects Standards № MSZ-13-183-2 “Traffic noise measurement. Railway noise” and № MSZ-07-2904 “Railway noise calculation”. The Ministry of the Environment and Water defined this task under the “Environmental goal competition 2002”, and entered into an agreement with KTI on the modernisation of these standards.

The following aspects of railway noise measurement standards were modified:

- Harmonisation with MSZ ISO 1996 standards, as required by the Guideline.
- Harmonisation with modernised calculation procedures.
- Rationalisation, taking into account local features of expansion.

The following aspects of railway noise calculation standards were modified:

- Harmonisation with the Guideline.
- Introduction of a correction factor to take into account the significantly shorter length of GANZ's second-class electric rail car series BDvmot.
- Introduction of a correction factor to take into account the significantly lower travelling speed of second-class Diesel rail car series Bzmot.
- Introduction of a correction factor on brake systems.

**Keywords:** noise, railway noise, environmental protection, Guideline 2002/49/EC.

**Ref. number:** 250-031-2-3

**Title:** EU compliant revision of Standard № MSz-13-183-1: “Traffic noise measurement”.

**Responsible leaders:** Sándor Hajdú

**Commissioner:** KAC - sponsorship – KVVM

**Starting and finishing dates:** 10.03.2003 – 30.06.2003.

**Abstract:** Guideline 2002/49/EC (25 June 2002) of the European Parliament and Council “on evaluation and treatment of environmental noise”, Annex II, Paragraph 3 states:

*„If a Member State intends to use its own official measurement method, that method must be corrected in compliance with definition of indicators of Annex I and with principles regulating long-term average measurements defined in Standards № ISO 1996-2: 1987 and ISO 1996-1: 1982.”*

Applicable determination factors are noise indicators as mentioned in Article 5 of ANNEX I of the Guideline.

The modification of the calculation method affects technical guideline № ÚT 1-1.302 "Road traffic noise calculation", which consistently uses charts as calculation tools, which, according to the Guideline, is inappropriate for the performance of automated calculations. For this reason, the method was modified, providing the possibility for the use of calculation formulae.

The modification includes the amendments required for harmonisation with the Guideline.

The following aspects were taken into consideration during the revision of the measurement method:

- harmonisation with the requirements of the Guideline;
- harmonisation with calculation standard draft regarding authorised noise loads.

**Keywords:** noise, road noise, environmental protection, Guideline 2002/49/EC.

**Ref. number:** 250-032-2-3

**Title:** Purchase and commissioning of radar devices for Püspökladány and Kőrishegy; Installation of a new taxi radar at Ferihegy – environmental work for *ISPA* competition.

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

**Commissioner:** PROMEI Modernizációs és Euroatlanti Integrációs Projekt Iroda Kht.

**Consultant of the Commissioner:** Ms. Dr. Ágnes Kolozsi-Ringelhann

**Starting and finishing dates:** 15.01.2003 – 10.04.2003.

**Abstract:** Purchase and commissioning of radar devices for Püspökladány and Kőrishegy; Installation of a new taxi radar at Ferihegy – Preparation of the environmental part of *ISPA* competition. After local inspection tours and negotiations, environmental and nature conservation authorities issued the approvals necessary for the change.

**Keywords:** *ISPA* competition, radar, environmental protection, environmental and nature conservation authorities.

**Ref. number:** 250-035-2-3

**Title:** Environmental analyses of the introduction of tolls on the M7 motorway – noise, vibration and air quality protection.

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

**Commissioner:** UKIG

**Consultants of the Commissioner:** Tamás Berg; Tamás Sztaniszláv.

**Starting and finishing dates:** 17.03.2003 – 15.11.2003.

**Abstract:** Noise, vibration and air quality studies were performed and municipal negotiations held in the 1<sup>st</sup> and 2<sup>nd</sup> quarters of 2003 along main road №7 in connection with the introduction of tolls on the M7 motorway. Air quality studies showed that, in addition to traffic, the most important factors are meteorological conditions. Noise studies showed that generally noise level changes are not significant. In general, it can be stated that measures to reduce the burden on the environment and the introduction of the four-day sticker were beneficial.

**Keywords:** toll introduction, air quality measurement, noise and vibration study, M7 motorway.

**Ref. number:** 250-057-2-3

**Title:** Environmental Program of Budapest's 13<sup>th</sup> District.

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

**Commissioner:** Budapest Főváros XIII. kerület Önkormányzat

**Consultant of the Commissioner:** Ms. Gabriella Dorogi

**Starting and finishing dates:** 31.08.2003 – 15.11.2003.

**Abstract:** An analysis was carried out into the current environmental condition of the district in accordance with the Environmental Program of Capital City Budapest, the National Environmental Program and district concepts, regulations and orders. An environmental program strategy was set out, program proposals made, and an action plan created in conjunction with the district's commissioners. The District Development and Environmental Committee approved the Environmental Program.

**Keywords:** environmental protection, strategy, action plan, capital city, Budapest's 13<sup>th</sup> District.

**Ref. number:** 250-041-2-3 and 250-042-2-3

**Title:** Creation of noise maps complying with the noise-mapping requirements defined by Guideline 2002/49/EC – Guideline-compliant noise-mapping of Budapest, XI<sup>th</sup> District – Phases I and II.

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

**Commissioner:** Ministry of the Environment and Water

**Consultant of the Commissioner:** Mihály Berndt

**Starting and finishing dates:** 01.08.2003 – 15.12.2003.

**Abstract:** A strategic sample noise map of Budapest's XI<sup>th</sup> District was prepared in compliance with Guideline 49/2002/EC. For this purpose, the data necessary to establish tables determining levels of involvement were acquired as set forth in the Guideline. The project included the creation of English and Hungarian guidelines for strategic noise-mapping and an action plan.

Directive 42/2002 on environmental noise evaluation requires that a noise map of Budapest be created by 2007. Therefore, we examined the methodological problems of noise-mapping in Budapest, set up a method and assessed further tasks.

The project results – i.e. a noise map showing the road, railway and industrial situation of the XI<sup>th</sup> District, a conflict map and the number of those involved – are also available in an A0-size poster.

**Keywords:** noise map, Guideline 2002/49/EC, conflict map, involvement.

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

**Ref. number:** 110-066-1-3

**Title:** Exploration of the possibilities for the development of the Mohács border port.

**Responsible leader:** Dr. Ernő Pál

**Contributor:** Béla Nógrádi

**Commissioner:** GKM Hajózási Főosztály

**Consultant of the Commissioner:** Tamás Marton

**Starting and finishing dates:** 10.11.2003 – 31.12.2003.

**Abstract:** Mohács plays a significantly upgraded role because of its proximity to the common border of three countries (Hungary-Croatia-Serbia), the displacement of the EU border subsequent to the accession, and due to the bridge over the Danube which is expected to be built. The town management is preparing to exploit the opportunities of these new roles with the elaboration and implementation of a long-term development strategy.

The main elements of the development strategy establishment of the border-port capable of meeting the modern Schengen requirements, and then further developing it into a public port as well.

For the preparation of the investment, analyses were carried out of the development trends in inland waterway transport and the related future trading changes in the region. Furthermore, trading services linked to the public port, and the possibilities of engagement to the public port have been specified.

Development opportunities of the common infrastructure linkage (road, railway) have been explored.

It can be concluded on the basis of the analyses and surveys that with partial development of the region's operating ports and with better co-operation, the current demands for inland waterway transport can be met, although parallel to the increasing intensity of border traffic management, and the enhancement of the border-port function, expansion of public port functions, as well as smooth, appropriate level performance of the surplus responsibilities arising from logistics tasks should be allowed for.

**Keywords:** inland navigation, ports, infrastructure, logistics.

**Ref. number:** 110-047-1-3

**Title:** Professional arrangements for the application of space information elements in the Information and Emergency Call System on the Danube.

**Responsible leader:** Dr. Ernő Pál

**Contributor:** Dr. Ákos Radóczy

**Commissioner:** GKM Hajózási Főosztály

**Consultant of the Commissioner:** Tamás Marton.

**Starting and finishing dates:** 10.11.2003 – 15.12.2003.

**Abstract:** As a result of the development of the Information and Emergency Call System on the Danube, a Hungarian test-section was implemented. In the elaboration of the dynamic traffic and transport management, experiences of the INDRIS project - finished in 2000 - were also used.

Results of the study will be used during the implementation of the COMPRIS project won by 44 enterprises from 11 countries within the EU V. Framework Program. Consequently, the RIS River Information System will be developed on the Hungarian section of the Danube. This decision was made at the CEMT 2001 Conference in Rotterdam.

The first versions of the Information and Organisation Architectures of the river information system were prepared, with our collaboration in the preparation of the Functional Architecture. Information and Functional Architectures of RIS can be used in the development of the Operation Test Platform.

Within the framework of our topic, inland waterway transport information on domestic practices of border crossing traffic was collected.

**Keywords:** inland navigation, logistics, space information, river information system.

**Ref. number:** 110-147-1-3

**Title:** Hungarian financing engagements in the international research project “COMPRIS” (Consortium Operational Management Platform River Information Services) won within the EU V. Framework Program (EU registration number: GRD2-2000-30161).

**Responsible leader:** Dr. Ernő Pál

**Contributor:** Dr. Ákos Radóczy

**Commissioner:** GKM Hajózási Főosztály

**Consultant of the Commissioner:** Tamás Marton

**Starting and finishing dates:** 10.11.2003 – 31.12.2004.

**Abstract:** The data available on mapping informatics have been collected for the preparation of electronic navigation charts (ENC).

Compilation of the international, multi-lingual communication tables for skippers, and translation and reading of the technical terms have been completed.

The Danube Information and Emergency Call System applied in Hungary is developed in co-operation with the National Association of Radio Emergency Call and Info-communication System. The first fruits of this have been seen in the establishment of a Hungarian test-section.

E-learning makes the system of tele-training possible in inland navigation. This means that communication between instructor and student may be automatised, and with the help of information and communication means it can even be supported on board ships in movement. The Hungarian e-learning possibilities have been surveyed, and proposals for introduction elaborated. Organisation Architecture has been developed for the Functional architecture of the river information system. Its purpose is to determine in a more detailed form the position of the river information system. The architecture of organisation describes the co-operation opportunities achievable by the river information system. It presents interactions between roles, tasks and units.

Collection of information on the practice of border crossing in Hungarian inland navigation has been completed. A proposal is being made for new, single print sheets. Surveying the simplification of the procedures of border control following the EU-accession has also been implemented.

**Keywords:** inland navigation, navigation information system, e-learning.

**Ref. number:** 110-067-1-3

**Title:** Situation of the indicators of transport energy in Europe.

**Responsible leader:** Dr. Imre Büki

**Commissioner:** GKM Innovációs és Környezetvédelmi Főosztály.

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

**Starting and finishing dates:** 11.2003 – 29.12.2003.

**Abstract:** The implementation of sustainable transport is subject to painstaking planning, consideration of the measurable economic, social and environmental factors, and followed up with the help of so-called indicators. Transport ministers of the *OECD* countries laid down at a meeting in May 2001 the guidelines that should be followed for the sake of sustainable development. Adoptable policy, methods and objectives of design can be determined by

studying the transport indicators specified within the framework of TERM (Transport and Environment Reporting Mechanism) activity.

In the following 7 groups, 40 indicators –(the most important from the aspect of sustainable transport) are specified by TERM proposal. Their application is a project for long-term achievement:

1. Environmental effects of transport.
2. Transport demand and intensity.
3. Regional planning and accessibility.
4. Ensuring of transport infrastructure and services.
5. Transport costs and prices.
6. Efficiency of technology and utilisation.
7. Integration of management.

Specification of EU TERM indicators and the establishment of an international statistics data basis will be the task of the EUROSTAT, which currently only partly meets the requirements. The EEA (European Environment Agency) surveyed the situation of the EU applicant countries in relation to the indicators.

On the basis of the EEA survey and other available transport-related EU statistics, estimations have been made - with reference to Hungary – of the TERM indicator data actually known in the EU data basis, and the domains in which the recording and provision of further data is necessary.

Much work is still required to be fully compliant with the EU requirements, especially from EUROSTAT and the Central Statistics Office . Efficient completion of the process requires a complete revision of the system of transport statistics with the collaboration of all transport participants.

**Keywords:** transport, energy consumption, sustainable transport, indicator.

**Ref. number:** 110-068-1-3

**Title:** Type approval and fuel consumption measurement of N1 category utility trucks.

**Responsible leader:** Dr. Imre Büki

**Commissioner:** GKM Innovációs és Környezetvédelmi Főosztály.

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

**Starting and finishing dates:** 11.2003 – 29.12.2003.

**Abstract:** In Hungary in 2001 the number of N1 category small utility trucks actually operating was over 261 000. Therefore, considering transport sustainability, proceeding with appropriate circumspection is justified in the course of type approval.

Law I. of 1994 stipulates compliance with European Agreement in the preparation and drafting of the statutory provisions. Consequently, KöHÉM regulations 5/1990. (IV.12.) and 6/1990. (IV.12.) dealing with technical inspection of road vehicles, as well as their entering into, and maintenance in traffic, comprise a regulation harmonised with the rules of the European Communities, giving the itemised listing of the relevant EU directives. Real conformity will be achieved by EU accession in 2004.

In 2001 the European Commission initiated through a proposal submitted to the European Parliament and the European Council a decrease in CO<sub>2</sub> emission and the fuel consumption of small utility trucks, which are responsible for 10% of the emissions caused by road transport. As a result, by the revision of directives 70/156/EEC and 80/1268/EEC, carbon dioxide emissions and fuel consumption measurements have also been extended to N1 category vehicles.

The problems concerning the revision of the directives are due to the facts that too many vehicle types and a great number of small manufacturers – deprived of skilled experts and appropriate measuring devices – are involved in this category. In order to moderate the type approval difficulties of the manufacturers, it is desirable on the one hand to issue exemptions from measurements, and on the other hand to permit the extension of the authorisations to other types as well. Relevant debates in which the European Commission, the European Parliament and the

European Council are the main role-players, notwithstanding the fact that Hungary will probably also have the opportunity to forward her opinion, prolong the revision procedure. Following the finalisation of the revision, the related tasks would be specified by Law I. of 1994, and the general law harmonisation ensuing from the accession.

**Keywords:** N1 category small utility trucks, type approval, emission, efficiency.

**Ref. number:** 110-058-2-3

**Title:** WERD (Society of West European Road Directors) Conference in Budapest.

**Responsible leader:** Mrs. Gyuláné Flórián

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Tamás Nagy

**Starting and finishing dates:** 05.05.2003 – 15.11.2004.

**Abstract:** A *TEM* - *WERD* Conference was held in Budapest in May 2003. Topics included dealing with harmonisation of the databases of *TEM* countries, and comparison and representation of road-network maps of the different countries. Topics of law harmonisation addressed to the terms of the EU-accession were discussed during the conference.

A proposal on a methodological scenario for traffic forecast has been prepared. TERN carries out an impact analysis within the framework of scenarios according to the following components:

- External factors with effects on traffic: demography, land use development.
- Transport system based on the existing system and future policy development.
- Description of future developments.

**Keywords:** harmonisation, road network, traffic forecast, *TEM* conference, network map.

**Ref. number:** 110-059-2-3

**Title:** Investigation and evaluation of the experimental operation of the container train tracking system based on *GPS*.

**Responsible leader:** László Valter

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; Gyula Kiss.

**Starting and finishing dates:** 12.05.2003 – 15.12.2003.

**Abstract:** The swap bodies manufactured by AGROKOMBI are appropriate for transporting bulk, diffuse goods, practically over long distances, mainly on direction-lines. Provision of a satellite system for the monitoring of the progress of these trains has been expected. Last year possible technical solutions of *GPS* applications, and possibilities for financing the relevant investment were presented, and for the implementation of the most effective investment those sub-contractors were consulted who before were selected in common with the Customer. As a result, the system was put into operation in 2002. Examinations were carried out concerning the experiences on running in and test run, as well as on the system's working capacity and its realisation, and on the way of eliminating the disadvantages of conventional traffic and ensuring the desired condition of the operation. Development trends were determined, especially concerning the introduction of the *GPS* train system in diffuse traffic and the provision of a safer energy supply. A proposal was made for the technical improvement of the system and its extension at both Hungarian and international levels.

**Keywords:** railway transport of goods, satellite tracking of goods, direction train, *GPS*, *GPSTrain*.

**Ref. number:** 110-061-2-3

**Title:** Preparation for the implementation of the telematics communication system between the Logistics Service Centre (LSZK) and the Industrial Park in Szolnok.

**Responsible leader:** László Valter

**Commissioner:** BILK Logisztikai Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; Zoltán Mosonyi

**Starting and finishing dates:** 12.05.2003 – 15.12.2003.

**Abstract:** LSZK is one of the outstanding logistic centres of the country. Its importance is enhanced by the fact that next to it an industrial park is also being implemented in the town. The topic is current, because, in accordance with an earlier concept of the Ministry of Transport, the development of informatics has to be started as soon as possible in the implementation process of the LSZK. The plan of LOGISZOL Kft., the operator of the logistic centre, is for the establishment of a so-called “virtual” logistics service centre, which, essentially, will undertake and carry out – through a physical and information network – all the tasks necessary for the smooth achievement of the processes of acquisition, production of goods, storing and marketing. Accordingly, the plan, and the possibility of linking up with the external modules of the LSZK have been studied on the basis of its technical construction. Since the industrial park – outside the scope of the ministry – is still at a very early stage of its implementation, proposals were drafted for tasks facilitating efficient co-operation between the two companies.

**Keywords:** virtual logistics centre, goods turnover infrastructure, environmental protection, informatics, industrial park, telematics.

**Ref. number:** 110-062-2-3

**Title:** Survey of the possibility of extending the radio-frequency coverage of logistic service centres with combi-terminals.

**Responsible leader:** László Valter

**Commissioner:** BILK Logisztikai Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; Zoltán Mosonyi.

**Starting and finishing dates:** 12.05.2003 – 15.12.2003.

**Abstract:** In accordance with the transport concept, in the future, telematics will generate informatics development in transport and commerce. In this field the state may have a role to play in the area of market regulation, supervision and international harmonisation. At the same time, the supplying of the basic data, management and operation (customs network characteristics, road condition, waterways, etc.) of the supplying systems are state responsibilities. Therefore, those fields of key importance in transport informatics and their related priorities where the state has or must have a role should be determined as soon as possible.

The informatics system of container management at “Józsefváros” *Combi-Terminal* has been supported with such an investment, and the other terminals under MÁV Kombiterminál Kft. management have been prepared with an adaptation of it. The system has proved instrumental in all its application forms, and consequently the task arose to prepare the radio-frequency coverage of the logistic centres supplied with combi-terminals in order to allow for network implementations on informatics grounds. In the logistics centres with combi-terminals, development and expansion of the antenna system operating on 450 MHz or 2.4 GHz, and ensuring the functioning of TEKLOGIX radio-frequency terminal systems were examined. The antenna units of the systems operating on 450 MHz cover a much greater area, while their transmission speed is lower than in the 2.4 GHz systems. TEKLOGIX supports both technologies, consequently selection of the carrier frequency is determined by the relevant application or the surroundings. As a consequence, it has been concluded that in Hungarian LSC-s – probably due to their size – the application of the carrier frequency allowing for faster data transmission is more successful.

**Keywords:** logistics centre, combi-terminal.

## *Division of Roads and Bridges, and the Research Director*

**Ref. number:** 101-002-2-3

**Title:** Trial section monitoring for road management purposes.

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

**Contributor:** Tibor Bors

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** István Szarka

**Starting and finishing dates:** 01.04.2003 – 01.02.2004.

**Abstract:** Some 60 trial sections, each of 500 m in length, selected from the Hungarian state highway network, have been monitored each year since 1991. Unevenness (roughness), rut depth, pavement structure bearing capacity, and macro and micro texture have been measured, while the condition of the surface defects has been characterised visually. The trial sections are characteristic for the whole network – differentiating 14 road section types – from the viewpoint of traffic volume, pavement structure type and subgrade bearing capacity. The results of the thirteen years of trial section monitoring carried out so far have made it possible to develop 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. The actual effect of rehabilitation techniques on improved conditions were evaluated and the deterioration features of rehabilitated sections compared to those before rehabilitation.

**Keywords:** pavement condition survey, trial section, pavement deterioration, pavement performance model, PMS.

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

**Title:** The actual effect of rehabilitation based on condition surveys.

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

**Contributor:** Tibor Bors

**Commissioner:** ÁKMI Kht.

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

**Starting and finishing dates:** 30.09.2002 – 30.11. 2003.

**Abstract:** The main purpose of the research theme was to reveal to what extent the various Hungarian road maintenance (rehabilitation) techniques can improve the actual levels of pavement condition parameters. For this reason, before and after condition improving interventions, the condition parameter (unevenness, rut depth, surface defects, bearing capacity, macro and micro roughness) levels of 500 m long trial sections which have been regularly monitored since 1991 and rehabilitated in the meantime were compared and evaluated. Furthermore, the changing of unevenness and rut depth data related to every rehabilitation activity on the national highway network in the period 1999-2001 was investigated.

An evaluation was also made of the typical condition parameter levels at which the decisions on various rehabilitation techniques are taken. Also a preliminary investigation was made into the deterioration tendency after interventions revealing whether they are more or less favourable than that of previous cycles.

**Keywords:** pavement rehabilitation, road condition survey, pavement deterioration, maintenance techniques, road maintenance, intervention limit.

**Ref. number:** 101-178-2-0

**Title:** Independent quality assurance tasks and control test on the road and bridge construction works on the M3 motorway and M9 expressway, as well as on the rehabilitation works on the M7 motorway.

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

**Contributors:** Ms. Ágnes Görgényi; Ms. Katalin Lukács; Elek Csókás; Gábor Mózes; Zoltán Tóth.

**Commissioner:** NA Rt.

**Consultant of the Commissioner:** Béla Somorai

**Starting and finishing dates:** 25.09.2000 – 30.10.2004.

**Abstract:** As part of the development of the Hungarian motorway network, the M3 motorway between Füzesabony and Polgár, the M7 motorway between the M0 expressway and Zamárdi, and the M9 expressway between road № 6 and road № 51 are being constructed or rehabilitated. KTI performs independent quality controls of these projects, checking the appropriateness of the laboratories of the Contractor and judging the technological production reports submitted by the Contractor. The main task, however, is the quality control of the projects, carrying out tests and subsequent evaluation using a prescribed number of samplings. The Institute immediately informs the Commissioner, National Motorway Ltd. and the Independent Engineer of any eventual inadequate results from the projects, and also summarises its remarks and recommendations in monthly reports. Before the projects are finally handed over, KTI takes part in the control of qualification documents. Finally, expert opinions are made by KTI on behalf of the Commissioner.

**Keywords:** M7 motorway, motorway construction, motorway rehabilitation, quality assurance.

**Ref. number:** 101-001-2-2

**Title:** Preparatory activities and technological design for the trial sections between km 19+350 and 21+150 of the M30 motorway, and technological design and evaluation of the condition of the test sections of road № 44.

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

**Contributors:** Dr. Imre Keleti; Ms. Ágnes Görgényi; Ms. Katalin Lukács; Gábor Mózes, Elek Csókás and expert team.

**Commissioner:** NA Rt.

**Consultant of the Commissioner:** József Hargitai

**Starting and finishing dates:** 01.01.2000 – 30.07.2003.

**Abstract:** The acceleration of the development of the Hungarian motorway network necessitates the preparation of the construction of up-to-date pavement structural variants fulfilling the actual long-term needs at a high level, instead of the verisons generally applied recently for the motorways with extremely heavy traffic. An expert team led by KTI made an overview of the domestic experiences and foreign trends in motorway construction. Based on this investigation, construction of semi-rigid, rigid and composite pavement structure variants which are considered as appropriate for the long-term endurance of the extremely heavy traffic expected on the M0 motorway, were proposed. The experts of KTI and the Technical University of Budapest compiled application approvals and technical production specifications for the new construction techniques. The Institute for Transport Sciences made the technological preparation and construction quality control of the trial sections of road № 44 which are being rehabilitated, and where the three pavement structural variants mentioned were built in summer 2003. The experience gained on trial sections will be utilised during the construction of motorway sections in the near future.

**Keywords:** motorway construction, pavement structure, pavement design, cement concrete pavement, heavy traffic.

**Ref. number:** 101-004-2-2

**Title:** Road maintenance techniques with reduced road closures (FORMAT project).

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

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Gábor Szőke

**Starting and finishing dates:** 21.11.2002 – 30.11.2003

**Abstract:** The FORMAT (Fully Optimised Road Maintenance) project, funded partially from the Fifth Research and Technological Development Framework Programme of the Commission of the European Communities, is carried out with the participation of the responsible leader of the KTI. The main aim of the theme is to develop a systematic approach for the selection of road maintenance and rehabilitation techniques with the minimum hindrance to traffic. For this purpose, the participating countries reported in their responses to a specifically designed questionnaire on the typical rehabilitation techniques for various pavement types, initial pavement defect types and volumes of traffic. Taking these results into consideration, a project and network level guide which allow the selection of the optimum (most appropriate from the viewpoint of performance, longevity, road user cost reduction etc) maintenance techniques in a given case were produced.

**Keywords:** road maintenance, road rehabilitation, road user cost, traffic hindrance, *FORMAT* project .

**Ref. number:** 101-007-2-2

**Title:** The Hungarian activity in the ELLPAG (European Long Life Pavement Group).

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

**Contributor:** Róbert Károly

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Gábor Szőke

**Starting and finishing dates:** 14.02.2003 – 30.11.2003

**Abstract:** The ELLPAG (European Long Life Pavement Group) was formed with the participation of ten European countries, including Hungary. The expert group plans to compile a state-of-the-art review of relevant European experiences practices and recommendations. The first phase of activity concentrated on flexible pavement types. Subgroup 1 dealt with the definition of long life pavements. The second subgroup summarised successful design and construction practices. Subgroup 3 reported on the techniques capable of converting pavement structures into long life variants. The topic of subgroup 4, led by KTI, was activities connected with the maintenance of the uppermost pavement layers. The fifth subgroup concentrated on economic calculations. Finally, areas of the topic requiring further research (knowledge gaps) were identified. As the continuation of the theme, a similar type of data collection and the introduction of best practices are planned initially for semi-rigid pavement structures and, later, for rigid pavement structures.

**Keywords:** road life, asphalt pavements, international co-operation, road design, road construction, road rehabilitation, road maintenance, ELLPAG.

## ***TEM Bureau***

**Ref. number:** 130-001-2-3

**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:** 01.01.2003 – 30.11.2003.

**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 an investigation into 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.

**Keywords:** TEM, international co-operation, motorway planning, road construction, traffic corridor.

**Ref. number:** 130-002-2-3

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

**Responsible leader:** Dr. Boldizsár Vásárhelyi

**Contributor:** Mrs. Jenőné Katona

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Tamás Nagy

**Starting and finishing dates:** 01.01.2003 – 30.11.2003.

**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 are provided, together with expert knowledge, 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 Hungarian party actively participated in updating the international conventions on road traffic regulation.

**Keywords:** traffic safety, transport policy, international co-operation, *UN ECE*.

**Ref. number:** 130-013-2-3

**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:** 01.01.2003 – 30.11.2003.

**Abstract:** Hungary has been participating in *OECD* programmes as a full member since the spring of 1996, and, as a consequence, in its „*RTR*” Programme (*Road and Combined Transport Research*). 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 international professional organisations of the world, a valuable outlook to their activities. Hungarian contributions were made in several topics (databases, environment, technology transfer, etc.).

**Keywords:** *OECD*, *RTR* programme, international co-operation.

## ***Division of Traffic Safety and Traffic Engineering***

**Ref. number:** 211-093-2-2

**Title:** Survey of the vehicle classification (speed measuring) performed by automatic traffic counters following the reprogramming of the instruments.

**Responsible leader:** Ms. Mária Cseffalvay

**Commissioner:** ÁKMI Kht.

**Starting and finishing dates:** 15.05.2002 – 30.11.2003

**Abstract:** Automatic vehicle categorising equipment (ADR 2000, RAKTEL 8000, HESTIA and QLD-6CX) used in traffic counting identify and classify vehicles according to tables specified by manufacturers. Until now the vehicle categories applied by these automatic devices were different from those specified by the Hungarian standard ÚT 2-1.109. Different classification made the revision of the vehicle type identification principles of the automatic equipment necessary; more definite and precise ranking into vehicle categories in Hungary was also necessary.

Within the framework of the work carried out over the past two years, a several-hour-long video recording checked some designated measuring points of the automatic classifying counters. With the help of surveys and the evaluation and comparison of simultaneous measurements, the frequency of the classification faults of the different instruments and the reasons for them have been shown; furthermore, given the vehicle categories as specified in the Road Technical Regulation, the error percentage of automatic devices was indicated. Based on a detailed analysis of the vehicle fleet and the measurement data, a proposal has been submitted for the differentiation of two-axle vehicles, and the modification of the classification algorithm of the classifying automatic devices.

In the second half of last year users entered proposed changes into the classifying softwares of the ADR and RAKTEL instruments (with manufacturer's collaboration in the case of RAKTEL). Afterwards test measurements were repeated on selected sites. Some corrections were proposed on the basis of comparative and adequacy analyses findings, and on the way of introducing the measurements made by the new classifying algorithm into the national traffic census.

**Keywords:** traffic census, automatic traffic counter, vehicle categorisation.

**Ref. number:** 211-095-1-2

**Title:** Participation in the *SARTRE-3* project: execution of the tests in Hungary (Drivers' attitude to road traffic risks in Europe). EU contribution to Hungarian research tasks.

**Responsible leader:** Miklós Gábor

**Commissioner:** VTT Technical Research Centre of Finland

**Starting and finishing dates:** 07.10.2002 – 31.07.2004

**Abstract:** Within the framework of the *SARTRE-3* project (Project on Social Attitudes to Road Traffic Risk in Europe) simultaneous interviews were prepared in 23 European countries in order to explore social attitudes to characteristic road traffic risks. 1000 interviewees in each country were questioned about life risks in general, the perception of road traffic risks, the role of speed in driving, alcohol and the wearing of safety belts. The drivers selected for interviews were also asked about other driving habits and road safety countermeasures. Within the framework of the project, together with related preparatory tasks, drivers in Hungary will also be interviewed in several phases.

**Keywords:** human factors, traffic attitude, road safety, *SARTRE* project, EU directives (road safety), international co-operation.

**Ref. number:** 211-096-1-2

**Title:** Cost/benefit and cost effectiveness analysis of road safety and environmental protection measures to be used by decision makers (*ROSEBUD*: Road Safety and Environmental Benefit-Cost and Cost-Effectiveness Analysis for Use in Decision-Making).

**Responsible leader:** Dr. habil. Péter Holló

**Commissioner:** BAST

**Starting and finishing dates:** 14.10.2002 – 30.06.2004

**Abstract:** KTI participates in the EU V. Framework Program as a member of an international consortium. The purpose of the research is to elaborate and provide such means and methods for decision makers by which the available resources can be used most effectively in road safety improvement: saving as many human lives as possible and preventing the most possible injuries with the help of the existing financial means. This is the only way to implement the EU transport policy objective of decreasing the number of road accident fatalities by 50% by 2010. Project tasks of the year 2003 included the exploration and elimination of the circumstances impeding the cost/benefit analysis. Problems were explored on the basis of interviews made with 5 national and 3 local level road safety decision-makers. The Norwegian Institute for Transport Economics (TØI) elaborated the questionnaires and is evaluating the replies. Processing of the proposals addressed to the elimination of the problems is underway.

**Keywords:** road traffic safety, environmental protection, cost/benefit analysis, cost-effectiveness, *ROSEBUD*.

**Ref. number:** 211-078-1-2

**Title:** Determination with Euro-conform methods of the losses to the national economy caused by road accidents.

**Responsible leader:** Dr. habil. Péter Holló

**Commissioner:** GKM Gépjárműközlekedési Főosztály

**Starting and finishing dates:** 28.03.2002 – 30.04.2003

**Abstract:** Until now only the “costing” method of falls in production caused by injury or death, the so-called “human capital” procedure has been used in practice for the quantification of the national losses resulting from road accident injuries. In countries with developed motorisation the so-called “willingness to pay” method - trying also to quantify the so-called “lost quality of life”, namely pain, mourning and sorrow – is increasingly wide-spread. With the proper combination of the two methods, significantly higher accident losses can be shown than with the one used solely so far in Hungary. The method should also be used in Hungary, because, on the one hand it is necessary to make comparisons with the highly motorised countries, and on the other hand the importance and growing role of road safety, demand it. Within the framework of the project, so far the methodological basis for research has been laid down, the surveying questionnaire has been prepared, and a wide scale professional collation of the theme has been carried out; in addition, TÁRKI collaborated in surveying the views of 1000 Hungarian drivers. Detailed results of the first evaluation are expected to be prepared by 2004.

**Keywords:** willingness to pay, road accident losses, road accident costs, questionnaire-survey, statistical processing.

**Ref. number:** 211-075-2-2

**Title:** Research co-operation concerning the road safety problems related to Austro-Hungarian trans-border traffic.

**Responsible leader:** Dr. habil. Péter Holló

**Commissioner:** Kuratorium für Schutz und Sicherheit

**Starting and finishing dates:** 18.03.2002 – 30.06.2003

**Abstract:** The increasing traffic between Austria and its neighbouring countries causes specific road safety problems because of the different infrastructures, legal regulations and driving attitudes. The objective of the research led by the Austrian party is a comparative analysis of the

practices of different countries, and then on this basis, to elaborate harmonisation proposals on the best practice. Within the framework of the project not only the accident and the traffic data were analysed in detail, but a questionnaire-survey with the involvement of 1000 interviewees has also been made at the Austrian-Hungarian border. Drivers were questioned on their journey destinations, and the travelling habits, rules and infrastructure of the neighbouring country. Tasks also included the exploration of accident frequency sites and the elaboration of proposals on their elimination.

**Keywords:** road safety, harmonisation, border traffic, traffic attitude.

**Ref. number:** 213-001-2-3

**Title:** Danger scale of railway crossings in the year 2002.

**Responsible leader:** Tibor Mocsári

**Commissioner:** Közlekedési Főfelügyelet

**Starting and finishing dates:** 04.2003 – 11.2003

**Abstract:** The number of accidents at railway crossings has increased since the year 2000, while on the whole road network since the year 2001 in comparison with previous years. The number of personal injury accidents at railway crossings increased by 15%: considering the last 9 years, 2002 was the year which saw the most accidents. The index of severity of personal injury accidents at railway crossings was also at its highest since 1996 (the tragedy at Kutas) in 2002 (65 fatalities /100 personal injury accidents).

The installation of lifting barriers and other traffic engineering interventions at previously dangerous locations (Budapest, Üllői Street, Székesfehérvár, road № 62) reduced the danger of accidents at these crossings. As a consequence it is important to install lifting barriers at railway crossings where accidents repeatedly occur or which are high on the danger scale. On the 2002 danger scale there are 31 railway crossings in all where two or more accidents occurred (4 accidents in 1 railway crossing, and 3 in 6 railway crossings) in the past 3 years (2000-2002). These railway crossings should be considered as accident black spots and their safety level should be improved.

The study describes the point system used for the preparation of the danger scale of the railway crossings, and the danger scale itself. After presenting the road safety situation of the railway crossings, proposals are given for accident prevention and the results of the interventions implemented until now are evaluated.

**Keywords:** railway crossing, road safety.

**Ref. number:** 213-081-1-2

**Title:** Effect on vehicle speed and accident situation of the interventions implemented on the national public road system.

**Responsible leader:** Tibor Mocsári

**Commissioner:** GKM Gépjárműközlekedési Főosztály

**Starting and finishing dates:** 04.2002 – 04.2003

**Abstract:** In order to survey the effect of the 2001 revision of the Hungarian *Highway Code*, measurements effected in March 2001 and March 2002 recorded in 61 ADR2000 traffic census sites were analysed (in fact, due to missing data and failed measuring data, figures from 42 sites have actually been analysed). Measurements were carried out in different parts of the country and on different road categories, inside and outside built-up areas alike. After the analysis of the measuring data it was concluded that on average the free speed of vehicles in the period following the Highway Code revision (March 2002) in comparison with the period before the revision (March 2001) outside built-up areas and inside built-up areas increased by 2.21 and 0.53 km/h, respectively (1.04 km/h total increase).

ADR data for the year 2001 have already been elaborated earlier, and the months January – April 2001 were compared with the months May – December 2001. On the basis of the results of the two surveys it is clear that the slight increase in the average free speed experienced in

2001 also increased in 2002. Speeds increased on all road categories, inside and outside built-up areas. The greatest increase was experienced on first category main roads: during one year the free speed of vehicles grew on average by 2.92 km/h. It is particularly noticeable that, although the revision of the Highway Code did not change the general speed limit valid for built-up areas, here, too a continuous, clear increase can be experienced, even if not to the same degree as outside built-up areas.

**Keywords:** *Highway Code*, speed, speed measurement.

**Ref. number:** 213-089-1-2

**Title:** Effect of traffic diversions due to construction on drivers' speed selection and road safety.

**Responsible leader:** Tibor Mocsári

**Commissioner:** ÁKMI Kht.

**Starting and finishing dates:** 10.2002 – 11.2003

**Abstract:** Selection of suitable traffic engineering signalling devices for closures at the sites of road works is very important, because the effect of these devices on accidents can be clearly indicated, and if properly chosen, can play a role in the prevention of accidents. The "ÚT 2-1.119" manual on closures and the provisional traffic regulation concerning sites of road works had been prepared before the general speed limit outside built up areas was increased by 10 km/h, therefore the speed and distance limits included in it should be revised. The regulation to be used in Germany, "Strassenbau A-Z", and the proposals of the ARROWS project elaborated within the framework of the EU IV framework program differ from the relevant Hungarian requirements on closures. Hungarian regulations should be revised, taking into consideration the updated foreign results and the new, modern products also marketed in Hungary.

Hungarian surveys revealed a great many problems (irregular overtaking, excessive speeding, neglecting advance warning signs), which prove that drivers are not conscious of the increased danger in the environment of closures. At the same time, visibility of closures at several sites could have been improved. When the reconstruction works of the M7 motorway were underway, the very severe consequences of fatal accidents were caused mainly by vehicles excessively exceeding the permitted speed limit. Speed measurements carried out on the motorway also showed that most drivers are not able to proceed at a speed appropriately limited to the nearby closure, even on a short section. Therefore, in addition to using the suitable traffic engineering devices, and the enforcement of the observance of the signs, the message sent to motorists on increased danger is very important. Police and mass media should play a greater role in this.

**Keywords:** closure of road works, traffic engineering, speed.

## ***TRANSORG, Division of Transport Organisation Development and Logistics***

**Ref. number:** 220-055-1-2

**Title:** Elaboration of a proposal for the survey of the content of the regulations related with the involvement of the professional interest representation organs affected in the topic of road vehicle drivers.

**Responsible leader:** Mrs. Miklósné Szilágyi

**Commissioner:** KöViM

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

**Starting and finishing dates:** 01.03.2002 – 31.03.2003

**Abstract:** The regulations related to the theoretical and practical parts of the driver education are to be surveyed, summarising the practices of the EU-countries and those of the organisations assuring the professional interest representation of the enterprises dealing with road vehicle driver training.

In this study the content and form of the regulations, issued by the Transport Superintendence, related to the training of motor vehicle drivers have been examined in detail, parallel to the publication of the regulations in a governmental order in relation to road motor vehicle training. The investigation was carried out with the involvement of the bodies representing the professional interest affected, with special respect to the conditions determining driver training, as an economic activity, further to the professional dispositions of the rules and to the modernisation of the training conditions. During the elaboration of the study a proposal has been made for the proper utilisation of the content and structural forms required by the publication of the regulations later in a ministerial order.

**Keywords:** driver training, administrative tasks of transport.

**Ref. number:** 220-060-1-2

**Title:** Hungarian participation in the INTERMODA project to be elaborated in the framework of the EU 5 program.

**Responsible leaders:** Dr. János Berényi; Mrs. Miklósné Szilágyi .

**Commissioner:** EU DG TREN

**Consultant of the Commissioner:** M. Schwarz, TINA Vienna-Transport Strategies GmbH, Austria

**Starting and finishing dates:** 12.2001 – 06.2003

**Abstract:** One of the most important objectives of the EU's transport policy is the development of proportions corresponding to the sustainable development in the field of the division of labour of the transport modes (road, railway, inland navigation), which is more advantageous than that of the proportion currently prevailing. The railways or inland waterways are not able to ensure high quality satisfaction of the transport requirements of the of the current globalised modern production-distribution systems, but there are far greater possibilities in conjunction with road transport. The term “inter-modality” implies that goods will be transported between their origin and destination using more than just one mode of transport. Naturally, this solution can only be viable, if each transport sector is used to full advantage.

In addition to setting the principles, the EU also established a research and development program for the foundation of the practical utilisation in 2001 under the title of *INTERMODA*. The objective of the project was to develop the transport systems of the European Union and of the countries of Central and Eastern Europe joining the EU in two stages over the coming years

in such a way that they shall all correspond to the system of requirements of sustainable development. The research included the following:

- the transport infrastructure;
- the terminals determining inter-modality;
- the quality of the services offered;
- the appreciation of the demands to be expected in the short and medium terms;
- the relieving of bottlenecks in the field of the infrastructure and the organisation

of the area investigated (EU15, the members joining in 2004, as well as the countries of the Balkan).

11 European countries co-operated in the project, with Hungary being represented by the KTI. The task of the KTI was twofold: on one hand the Institute contributed actively to elaboration of the project, and on the other hand the Institute gathered, analysed and processed the details regarding transportation, infrastructure, engineering, juridical issues, etc. prevailing in Hungary and the possibilities of development involving the domestic companies affected in this field.

**Keywords:** inter-modality, sustainable development, transport infrastructure.

**Ref. number:** 220-068-2-2

**Title:** Elaboration of a development plan for bus transport promoting a bridging of the gap based on the demands of preferential areas.

**Responsible leader:** Dr. János Berényi

**Contributors:** Mrs. Endréné Trepper, Béla Zsolt Garda, Ms. Anna Kocsis, Béla Nógrádi, Mrs. Sándorné Földesi, Lajos Vass.

**Commissioner:** Kunság Volán Ltd.

**Consultant of the Commissioner:** Szabolcs Hunyady

**Starting and finishing dates:** 19.07.2002 – 31.03.2003

**Abstract:** The basic goal of the project was to establish a real and easily dimensionable picture of the public transport in the county of Bács-Kiskun, and, within this, of scheduled inter-town bus traffic, in order to ensure the transport service most suited to the requirements of the county's network of settlements. The need for this is supported by the fact that the small areas of the county, with the exception of the small area of Kecskemét, fall under the category of small, preferential area, which means an accepted support of the demand for the development of the area concerned.

The detailed survey included the investigation of the institutional provision of the small areas of the county for the first time, and the determination of the travelling demand supplementing the infrastructure, for which the passenger traffic data were assured by cross-sectional and line destination-traffic surveys, as well as by interviews. In addition to the general part of the survey, independent brochures were elaborated for the individual small areas, showing the characteristics of the small areas in a nearly equal structure, the results obtained from the surveys, and the conclusions and proposals necessary from the point of view of transport.

**Keywords:** scheduled bus transport, small area, preferential small area, county of Bács-Kiskun, concept of the bus-network.

**Ref. number:** 220-076-1-9

**Title:** Hungarian participation in the *OSSA* project to be elaborated within the framework of the EU5 program.

**Responsible leaders:** Dr. János Berényi; Dr. András Jávör; Dr. Gábor Szűcs.

**Commissioner:** EU DG TREN

**Consultant of the Commissioner:** V. Sebastian, ETRA+D+Investigacion y Desarrollo SA

**Starting and finishing dates:** 01.03.2000 – 31.03.2003

**Abstract:** The purpose of the *OSSA* project was to establish a standard, open road-network and traffic simulating framework system, through European collaboration, which offers the possibility for connection between the various traffic simulators, traffic engineering systems and

data-sources. The task included the simulation and analysis of the traffic occurring on the road network of a town, and the establishment of a decision making system. The motivation of the research work is strongly user-oriented: the targeted users include the traffic planning experts of the smaller and bigger towns and public transport experts.

The development of the framework system was based on a model which included all the individual elements making up the traffic simulation (topology, topography, environmental factors, human factors, etc.). During the simulation, made with the aid of the framework system, each module receives the input data during functioning, and gives the results, which can be used in other modules. This is a complicated traffic simulating system, which accomplishes an exact analysis of the road network of the major towns and requires an extraordinarily high capacity for calculation. Therefore, it was expedient to build up the system with modular elements, where the individual modules can be placed in separate computers. A further advantage of the modular structure is that the individual components can be changed accordingly, when the communication is made through a well defined interface, making the system extremely flexible. During the planning phase the main standpoint was the utilisation of reusable components. It was important that the modules prepared could easily be developed further or could easily be used in other framework systems as well. The actual framework system has a structure, where the individual modules can be changed, allowing the running and evaluation of a given scenario with the aid of two different simulation modules.

**Keywords:** network- and traffic-simulation, traffic engineering and controlling system, decision supporting system.

**Ref. number:** 220-078-2-2

**Title:** Elaboration of the rationalisation plan for the local bus transportation of Debrecen based on a passenger traffic survey.

**Responsible leaders:** Dr. János Berényi, Dr. István Zsirai

**Contributors:** Zsolt Béla Garda, Ms. Anna Kocsis, Mrs. Sándorné Földesi, Béla Nógrádi, Mrs. Endréné Trepper, Lajos Vass.

**Commissioner:** Hajdú Volán Ltd.

**Consultant of the Commissioner:** Géza Zilahi-Sebess

**Starting and finishing dates:** 02.09.2002 – 15.02.2003

**Abstract:** An investigation was carried out into local public transport in Debrecen and, within this, into bus, tram and trolley-bus traffic, and rationalisation recommendations were made on several occasions between 1974 and 1994 on the basis of our own passenger counts. Now, after a gap of about 8 years, we have repeated this investigation, based on a broader passenger count and including –weekend traffic.

The detailed investigation of the situation and the passenger count included all the local services and the whole public transport network. Interviews were carried out at certain fixed stops along the urban public transport network to ascertain information on the composition of passenger groups, transport relations and other journey characteristics (purpose, type of ticket used).

The surveys were carried out on the same days (October 16<sup>th</sup> and 26<sup>th</sup> 2002) on the whole transport network of the town, and so naturally in the operating area of the *DKV Ltd.*, as well, at the request of the transportation associations.

The processing of the cross sectional passenger counting data was performed with the aid of the *Cross '96* and *BusCross 'H* applications, developed by the TRANSORG of the KTI, and which have already been successfully used in the surveys of other towns.

On the basis of the evaluation of the network, rationalisation and development proposals were prepared for the service-network; application of these could lead to the increased profitability of the operation, and would mean that the increased passenger traffic demand of the town arising from the territorial development of the town could be better satisfied. A separate proposal was elaborated for the rejuvenation of the ageing vehicle fleet, which was a critical problem.

**Keywords:** Debrecen, urban transport, rationalisation.

**Ref. number:** 220-085-2-3

**Title:** The conception of the urban section of the local and surrounding bus-network demanded by the development of Nyíregyháza.

**Responsible leaders:** Zsolt Béla Garda, Mrs. Endréné Trepper.

**Contributors:** Ms. Anna Kocsis; Béla Nógrádi; Mrs. Sándorné Földesi; Lajos Vass.

**Commissioners:** Szabolcs Volán Ltd.; Municipality of the county town of Nyíregyháza.

**Consultants of the Commissioner:** Dr. Péter Huba; Gábor Zolnai.

**Starting and finishing dates:** 30.04.2003 – 30.10.2003

**Abstract:** One of the most important conditions of sustainable mobility is the stopping of area losses of public transport, which is true both for the local scheduled bus traffic of the county town of Nyíregyháza and for the reception of commuter traffic of the buses touching the town. One of the major goals in the development of transport in the county town is the improvement of the level of public transport between the town and its surroundings, while also maintaining the town at a manageable level. For this purpose, we have surveyed, investigated and analysed the sections of the local and surrounding bus networks to be found in the town, their connection points, the capacity of the present bus station and the places, where enlargement is possible, and the modifications which should be recommended, together with their economic impacts. We prepared interviews for the survey of the exact traffic picture, and also used the comprehensive cross-sectional passenger counting data accomplished on the inter-town network of the company Szabolcs Volán Ltd.

Having determined the required data basis and surveyed the situation, our goal was to provide those concerned, through the designation, analysis and impact investigation, with the means to make the best possible decision with regard to the development of public transport in Nyíregyháza and the surrounding area.

**Keywords:** Nyíregyháza, bus-transport, bus-station, capacity-investigation, road network, preparation of the decisions.

**Ref. number:** 220-086-2-3

**Title:** Evaluation of the situation of passenger transport for the Szabolcs Volán Ltd. based on a survey of travelling demands and the elaboration of a development strategy for the bus network.

**Responsible leaders:** Dr. István Zsirai, Zsolt Béla Garda, Mrs. Endréné Trepper.

**Contributors:** Ms. Anna Kocsis; Mrs. Sándorné Földesi; Béla Nógrádi; Lajos Vass; Mrs. Gáborné Török.

**Commissioner:** Szabolcs Volán Ltd.

**Consultants of the Commissioners:** Dr. Péter Huba; Tibor Mezősi.

**Starting and finishing dates:** 15.02.2003 – 15.09.2003

**Abstract:** A comprehensive three-day passenger count was carried out for the inter-town bus-traffic of the *Szabolcs Volán Ltd.*, first in 1997, and then repeated in 2000, and, in relation with the present project, in 2003.

The goal of this project was two-fold: that is, to provide an analysis capable of helping to improve the level and profitability of the traffic service, and to determine a medium and long term development strategy for scheduled bus-traffic.

During this project we made use of the information attained through the three-yearly survey which has made it possible to see numerous changes. As part of the process the small-area division was used as a new element, which gave new possibilities for both rationalisation and strategy.

The characteristics of the bus traffic service were evaluated separately on the basis of “satisfaction” interviews.

Medium and long term development strategies for Szabolcs Volán Ltd. were devised, and these dealt with:

- tasks for the surrounding area and suburbs;
- the development of long distance services;
- tasks for bus services related to the possible elimination of a railway line.

Proposals have been elaborated for the actual rationalisation tasks with the strategy broken down into details.

**Keywords:** Szabolcs County, bus traffic, small area, development strategy, rationalisation.

**Ref. number:** 220-087-2-3

**Title:** Possibilities for the industrial and logistics development in the area of Komárom-Almásfüzitő and its catchment area, with special reference to the role of the Industrial Park and Logistics Centre of Almásfüzitő.

**Responsible leader:** Béla Nógrádi

**Contributors:** Institute for Energy Management; University of Western Hungary; István Széchenyi University of Győr; Technical University of Budapest; TÉRTERV, experts of the firm MAVTI; Pannónia KKK; Concinfo Ltd.; MIKON Engineering Office.

**Commissioner:** Industry Developing and Utilising Ltd. of Almásfüzitő

**Consultant of the Commissioner:** Dr. Pál Gágyor

**Starting and finishing dates:** 01.03.2003 – 15.08.2003

**Abstract:** Following the change in the political system in Hungary a great structural reorganisation was made in the domestic economy, which affected the different parts of the country in different ways. Komárom and the surrounding area were particularly badly affected, as the leading industrial basis ceased to exist, and valuable plants with good infrastructures lay idle, whereas the unemployment level and the number of inactive inhabitants in the area are very high. The most important plant of the area, the Alumina Factory of Almásfüzitő employed several thousand people while it was operational, and also many more indirectly through the provision of services to meet the demands of those employed in the factory. The purpose of this research project was the elaboration of a complex recommendation for the re-utilisation of the inactive plants (especially the Alumina Factory of Almásfüzitő).

Within the framework of the research project, co-ordinated by the KTI, a brown-field proposal was elaborated with the co-operation of several well known institutions; this offered the possibility of building a number of progressive solutions, taking into consideration all the advantageous possibilities of the unused plants. The proposal considers the tri-modal traffic possibility of the area concerned, the existing rich infrastructure, and the establishments to be re-utilised. The development proposals are in harmony with the objectives of the *National Development Plan*.

The project proposal is the basis for the preparation of the tenders related to the budgetary resources required for the realisation of the project. The research study elaborated includes a utilisation proposal, which can also serve as a model for the re-usage of unused plants in other parts of the country.

**Keywords:** logistics service centre, industrial park, innovation centre, agricultural logistics centre, combined transport, bio-ethanol plant, Almásfüzitő, *National Development Plan*.

**Ref. number:** 220-092-2-3

**Title:** Investigation of the possibility for increasing the proportion of combined transport, and an exploration and analysis of the possible methods of stimulation.

**Responsible leader:** Mrs. Miklósné Szilágyi

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. János Verbóczy; GKM; Gyula Kiss, BILK.

**Starting and finishing dates:** 15.05.2003 – 28.11.2003

**Abstract:** The endeavours of the EU, our imminent accession to the EU, and the measures limiting the amount of freight transport on the road make it more and more urgent for Hungary to increase the proportion of combined transport.

The current situation of combined freight transport have been surveyed, together with the limits for development. In addition to Hungarian transport political objectives, the regulating systems operating in the European countries and the international road freight transport system were

taken into account; in addition, international experiences and plans used in this field as well as transport policy objectives were explored. On the basis of this survey recommendations for the application of methods of stimulating an increase in the share of combined transport in Hungary were elaborated.

**Keywords:** combined freight transport, environmentally protective freight transport, transport policy.

**Ref. number:** 220-093-2-3

**Title:** The legal harmonisation of combined freight transport in the light of EU accession, with special regard to the regional co-operation of the four countries of the Visegrád area, in the spirit of the statement by the transport ministers of the four countries.

**Responsible leader:** Mrs. Miklósné Szilágyi

**Commissioner:** BILK Kombiterminál RT.

**Consultants of the Commissioners:** Dr. János Verbóczy; GKM; Gyula Kiss, BILK

**Starting and finishing dates:** 30.05.2003 – 15.12.2003

**Abstract:** The forced development of combined freight transport shall be realised in harmonisation with the directives of the EU, bearing in mind the regional co-operation of the four countries of the Visegrád area.

The objective of the research project was an examination of the current situation in the field of inter-modality in Hungary, in the region of the four countries of the Visegrád area, and in the countries of the EU. The role of the combi-terminal network in the European system was investigated.

Taking into consideration both present and future transport connections, recommendations were elaborated for the promotion and further development of environmentally friendly transport methods within the region concerned, and for the expansion of the possibilities for co-operation.

**Keywords:** combined freight transport, harmonisation, combi-terminal network, Visegrád area.

**Ref. number:** 220-094-2-3

**Title:** Elaboration of a freight transport forecast of the planned logistics service centres, bearing in mind Hungary's accession to the EU.

**Responsible leader:** Gyula Simon

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; Zoltán Mosonyi.

**Starting and finishing dates:** 21.05.2003 – 30.11.2003.

**Abstract:** The economic changes which have accompanied the political changes during the last decade and a half in Europe and in Hungary have significantly changed the face of freight transport. The changes have resulted in important changes in the volume and direction of freight traffic, leading in turn to different proportions as well. It has become necessary, therefore, to bring up to date the earlier forecasts regarding freight transport, and included in this, to make estimates of the expected levels of international road and railway traffic of the individual logistics centres in their catchment areas.

During the elaboration of the new prognosis, the starting point was an analysis of the performance data for the period between 1992 and 2001, and a determination of the expected freight traffic in the main transport directions, taking into account the factors influencing the estimated freight traffic during the period in question.

**Keywords:** road freight transport, railway freight transport, main transport direction, prognosis, logistics catchment area.

**Ref. number:** 220-095-2-3

**Title:** The strategic possibilities of the Baltic Sea and the Adriatic ports (*POLCORRIDOR*) in the light of the national network of Logistics Service Centres.

**Responsible leader:** Gyula Simon

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; Zoltán Mosonyi.

**Starting and finishing dates:** 21.05.2003 – 30.11.2003

**Abstract:** The goal of the *POLCORRIDOR* project is to develop the Trans-European inter-modal freight transport system between northern and southern Europe, as well as Eastern Europe, and also to make evaluations from the commercial viewpoint. The central structure of the system is a "Shuttle Train" system passing through Poland, the Czech Republic and Austria, and connecting Finland, Norway and Sweden with Northern Italy, Slovakia, Hungary, Rumania, Bulgaria, the countries of the Balkan Peninsula and Greece via a land-sea "bridge". The objective of the study was to investigate the strategic possibilities, which would be assured for Hungarian rail traffic, and the main national logistics centres in the case of participation in the "POLCORRIDOR" project.

Joining the "POLCORRIDOR" or "AMBER-route" project, and participation in the research activity can bring favourable results later in organisational tasks. This is particularly true with regard to the transfer of the incoming road traffic onto the railways, as the project, being realised with international co-operation, will have an effect on those areas where there may be future organisational difficulties for the Hungarian railways.

**Keywords:** *POLCORRIDOR* project, *AMBER-Route* project, combined traffic.

**Ref. number:** 220-096-2-3

**Title:** Possibilities for the introduction of state tenders for the development of the logistics service centre network, with special reference to the tendering system of the *National Development Plan*.

**Responsible leader:** Zsolt Béla Garda

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; GKM; Zoltán Mosonyi, BILK.

**Starting and finishing dates:** 02.06.2003 – 28.11.2003

**Abstract:** When trying to characterise modern-day Hungary, it can be justifiably stated following the era of EU legal harmonisation, we have now entered the era of tender competitions. We now tender for almost everything, for EU financing and financing from other sources.

Courses teaching how to enter tendering competitions are starting continuously, and we hear all the time how important well prepared applications and the exact matching of the objectives with the goal of the tender can be, but the most important step in the beginning is finding the tender invitation which corresponds to our requirements. This research project explored the state tender invitations related to the establishment of logistics centres and industrial parks, either directly or indirectly through connections with individual areas or services. Possibilities for participation in the operative programs (OP) fitting the objective of the *National Development Plan* were investigated and presented, initially in the *Economic Competitiveness Operative Program*, and then in the related *Program Supplementing Documents*. The study includes the tender invitations, and also gives useful advice for the would-be applicants and publishes useful Internet and home page addresses.

**Keywords:** preparation of tenders, *National Development Plan*, *Economic Competitiveness Operative Program (GVOP)*, logistics service centre, industrial park, EU competitions, *Structural Funds*.

**Ref. number:** 220-098-2-3

**Title:** Possibilities for the integration of Nyíregyháza, Békéscsaba, Kecskemét, Dunaújváros and Veszprém as logistics de-centres..

**Responsible leader:** Béla Nógrádi

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba; GKM; Zoltán Mosonyi, BILK.

**Starting and finishing dates:** 21.05.2003 – 30.11.2003

**Abstract:** The conception of the Hungarian national logistics centre network was elaborated at the beginning of the 1990s. After several modifications, the realisation of a trunk-network consisting of eleven areas and thirteen centres (three in Budapest) was formulated. The traditional county-structure of Hungary provides a natural base of important logistic services (distribution activity), which will continue to play an important role in the processes of the production and distribution. The elimination of the existing establishments and services would be meaningless, as it would if they were not to play a role in the national logistics network. A recommendation for integration into the national trunk-network as de-centres will be prepared for five towns (four county towns and Dunaújváros), on the basis of the economic structure and an analysis of the freight traffic.

**Keywords:** logistics service centre, industrial park, freight traffic, infrastructure, transport corridor.

**Ref. number:** 220-099-2-3

**Title:** Impact analysis of the realisation of logistics service centres, and elaboration of the conception forming the national interest.

**Responsible leader:** Dr. István Zsirai

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Dr. Attila Csaba, GKM; Zoltán Mosonyi, BILK.

**Starting and finishing dates:** 21.05.2003 – 28.11.2003

**Abstract:** The study includes the following current tasks within the development of the logistics service centres:

- an analysis of the logistics service providers in Hungary,
- an elaboration of the criteria for the ranking of the national logistics centres,
- an analysis of the probable prospects and potential problems of the logistics service centres.

The study dealt with the determination of the national interests in the field of development, and the question of financing, with special reference to EU accession, as separate topics.

**Keywords:** logistics service centre, financing, logistics services, freight traffic.

**Ref. number:** 220-003-2-3

**Title:** The effects on combi-terminals and the major national logistics service centres of the changes in customs regulations following Hungary's accession to the EU.

**Responsible leader:** Dr. István Zsirai

**Commissioner:** BILK Kombiterminál Rt.

**Consultants of the Commissioner:** Gyula Kiss; Zsolt Fülöp.

**Starting and finishing dates:** 21.07.2003 – 30.10.2003

**Abstract:** The research project deals with an area of the logistics centres which is subject to qualification and control, namely the conscious installation of the customs services and the related financing problems.

Accordingly, the project deals with the following:

- evaluation of the role of the logistics service centres and combi-terminals in the customs system following EU accession;
- elaboration of the process-model built on the technological system of the logistics service centre;
- the problems arising from the establishment process,
- elaboration of a servicing model built on the operating process;
- elaboration of a cost-revenue model of the logistics service centres;
- elaboration of the financing system for the customs offices within the logistics service centres.

**Keywords:** logistics service centre, customs clearance, financing.



## *Division of Transport Economics*

**Ref. number:** 271-002-1-3

**Title:** Trading possibilities of the GySEV Rt. within the framework of the new European system of freight organisation, in connection with the company development strategy.

**Responsible leader:** Árpád Tóth

**Commissioner:** GySEV Rt. Vezérigazgatóság

**Starting and finishing dates:** 05.05.2003 – 30.06.2003

**Abstract:** In comparison with other regions, Hungary's West-Transdanubia is in a most favourable situation, although the physical infrastructure for development is lacking. Internal transport relations – especially along the north-south axis – are relatively undeveloped. At present, the Hungarian schemes on transport development support primarily the expansion of the motorway network, which, for the foreseeable future at least, does not concern the region.

Here, there is a significant demand for transport, and in particular for the development of the railways. However, based on the currently very low level of freight traffic, it is questionable whether any significant increase in demand can be expected in the future. The possible sources of additional traffic include Hungarian domestic traffic, north-south transit traffic (general economic development resulting from EU accession), *POLCORRIDOR*, Amber Route traffic – that is, traffic attracted here by the new services (developed specifically for this purpose), and trans-Alpine Austrian traffic; in addition, the rising costs and increased congestion in European road transport, and local/regional railway initiatives (VBV) wishing to re-establish the lines crossing the existing borders may provide future sources.

On the basis of detailed analysis it was found that taking into consideration all the above factors such an increase in traffic could be realised in the west-Hungarian region, which justifies the north-south development of the railway.

Analysing the situation following the modernisation by PannoniaRail of the Sopron-Győr and Sopron-Szombathely rail links, as well as the railway development schemes described in the Austrian All-transport Plan, it is clear that a revaluation of the role of the Szombathely-Szentgotthárd and Körmend-Zalalövő lines, as well as the necessary modernisation are required.

**Keywords:** West-Transdanubian Region, north-south direction railway development, traffic increase.

**Ref. number:** 271-004-2-3

**Title:** Possibilities and conditions for the replacement of railway traffic with bus traffic on the lines designated by the MÁV Rt. in order to moderate the necessary state subsidies.

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** MÁV Rt.

**Starting and finishing dates:** 30.06.2003 – 30.11.2003

**Abstract:**

- 60 secondary railway lines, covering a total distance of approximately 2400 km, were selected and evaluated from road research aspects (as only data on road transport and railway price compensation was available) to ascertain the possible consequences for the state and passengers of replacing the rail transport on certain secondary lines with buses. A summary of the results is as follows: It would be expedient to maintain railway

passenger traffic on about 900 km of the secondary railway lines, because alternative bus traffic would be advantageous either only for the state (on 161.5 km), or only for the passengers (on 56.7 km) or for neither (680 km). On the one hand, the main reason is that construction of the missing road sections would require very high investment, and on the other hand the alternative bus transport is extremely disadvantageous for passengers (essentially longer travel time and significantly higher fares), notwithstanding that it would mean a higher price compensation than the present one.

- It would be more profitable to replace railway passenger transport with bus traffic on a 615 km section, partly because the alternative bus traffic would be advantageous for both the state and passengers (254.4 km), and partly where it would definitely be beneficial for the state, with minimal disadvantage for passengers (360.4 km).
- Finally, it would be worth making a more detailed (local) survey along at least a 845 km section of secondary railway. This is partly because the results obtained on the basis of the available data and possibilities suggest that in the case of a variant advantageous for both the state and passengers, the construction of a new road would incur excessive costs (96.8 km). The variant which is only advantageous for the state implies significant disadvantages for passengers, especially because of the essentially higher fare (244.3 km). There is no such variant in this category which would be advantageous for passengers only. On secondary railways, where the alternative bus traffic is equally disadvantageous for both state and passenger (higher price subsidy, higher fare (503.7 km)), the cost items should be revised as the infrastructure costs of the railway are not included here.

**Keywords:** secondary railway, alternative traffic, public service, adequacy.

**Ref. number:** 271-007-1-3

**Title:** Views on financing concepts relating to the construction of the national expressways.

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** András Székely

**Starting and finishing dates:** 10.01.2003 – 15.02.2003

**Abstract:** A Public-Private Partnership can be considered as one form of public acquisition. The private sector undertakes the project-related liabilities of the government (public body), as well as, either partially or wholly, the risk itself. On the basis of the projects studied, it can be unanimously stated that the infrastructure investments implemented within the framework of PPP are (almost) exclusively based on concession contracts, and the type of contract in itself does not influence the profitability and efficiency of the project. However, it should be kept in mind that if private capital is also involved in financing, the total cost of investment would be higher than in the case of purely state financing. In general, “the best solutions” are those where the public and the private sector run the risk of operation jointly. Contracts concluded in the form of PPP could be: DBFO, DBOOL or BOT + leasing, i.e. the private sector (consignee) is responsible for all designing details, financing, construction, operation, and maintenance, but not for the collection of fees. The consignee operating under the concession contract may only have moderate autonomy (there is no autonomy where designated alignment and track design are concerned). Expediently, stand-alone projects should be elaborated for each, non-interconnected network section for which the government or the public body concerned concludes a separate contract. Risk sharing between the consignee and the public body (government) increases the success of the project (most construction, financial, and operation risks rest upon the private sector, while the traffic risk lies with the state). Projects would be financed from different resources (state budget + private + EU Cohesion Fund + state guarantee).

**Keywords:** motorway construction, motorway financing, PPP, contracts on financing.

**Ref. number:** 271-010-1-3

**Title:** System of terms and magnitude of the private capital drawable in the development of the public road system on the basis of Government Resolution № 2004/2003. (III.14.) Item 5.3.

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** ÁKMI Kht.

**Starting and finishing dates:** 18.04.2003 – 13.06.2003

**Abstract:** The study investigating the financing possibilities of the expressways through the involvement of private capital presents first the experiences of transport infrastructure investments implemented within Public + Private Partnership. It is concluded that in the framework of operative leasing, first of all bridges, ports, and airports are constructed and not motorways (with the exception of one, not very efficient case).

According to the experiences gained on the basis of the studied projects, it was concluded that private capital could be drawn into transport infrastructure financing if in the development of the PPP, the private capital views are taken into consideration from the outset (soundness and discountability of planned project). Consequently, the most important criterion of private capital involvement is project rentability.

The amount of private capital to be involved depends, obviously, on the following: the higher the internal rate of return and the income generating potential of the planned project, the higher the potential proportion of capital involved. The proportion of private capital involved varies greatly from project to project, but 15-25% private capital and 75-85% credit can be considered as a typical ratio. The involvement tends to be higher if the private capital credit is supported by state guarantee. In case of very favourable rentability indicators, involvement could even be as high as 100%; the scheduling depends on the character of the project, and its technical features. In the initial phase of the project (preparation), the participation of the private capital is minimal; it is confined only to the establishment of the independent consortium required for the development of the project. Ideally, the concessor, as the contracting party of the government, is already “actively” on the field from the outset of the construction work. In the case of construction of a motorway supposed to be started in 2004, the concession company should be established by the end of 2003, in such a way that all characteristics of the project selected for implementation are known. Active participation of the private capital should only start after this. Instead of operative leasing, the study proposes a shadow fee solution, because one part of the national rules, i.e. the Civil Code, should be revised in the former case, as the national road network is currently in state ownership and can not be alienated (not even provisionally). On the other hand, the shadow fee motorway allows for accelerated construction, operation risk sharing between the public body and the private sector, and indicating the loans in the books of the concessor, not those of the state.

**Keywords:** financing motorway construction, operative leasing, cost/benefit analysis, involvement of private capital.

**Ref. number:** 271-011-2-3

**Title:** Some characteristics of the European freight market.

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** Skoglund Holding Befektetési Rt.

**Starting and finishing dates:** 23.04.2003 – 05.05.2003

**Abstract:** Participants in the transport of the EU Member States feel that transport sectors of have been neglected, considering the role of the EU. The economic position of transport companies has declined in comparison with that of other sectors. There is a considerable fear that the countries currently joining could gain an important share in a freight market, which up until now has not appeared to be expanding, as a result of their competition advantage arising from their unrealistically low costs,. The public fear a mass influx of environment polluting Eastern-European vehicles, which do not meet the more stringent EU regulations. General opinion is that the expanded European transport market should only be liberalised if new members increase their levels of wages, social conditions, technical development, etc.

The approach of the countries currently joining is exactly the opposite: they expect the expanding and liberalised market to increase their competitiveness, leading to spectacular wage rises and the creation of the resources necessary for modernisation. The countries currently joining and their organisations engaged in transport are afraid of the undoubted superiority of the western firms with regard to finance, technology, institutions and organisation. This is interrelated perhaps with the raising and demanding of restrictive measures and regulations concerning access to domestic transport markets. The challenge facing the applicant countries is really dramatic; on the one hand their fear of a mass influx of western hauliers with greater economic, technological and management potentials is justified, while on the other hand, they should be able to preserve their market share, and at the same time even increase it, through improved competitiveness as a result of the sudden development of the existing technological and freight organisational terms. The private resources of the domestic firms are insignificant for the enhancement of the process of modernisation, and the development of up-to-date freight organisational terms, while credits are expensive and difficult to obtain, and receiving support from budgetary sources is hopeless, not only in principle but also –in practice.

The trend in the small and medium sized segment of the market will probably be for foreign firms to appear through acquisition of property and buying-up (capital concentration), rather than through direct action.

**Keywords:** freight market, transit costs, freight costs, taxation.

**Ref. number:** 271-015-1-3

**Title:** Preparation of new legislative regulation of scheduled road passenger transport, taking into consideration public service commitments and the introduction of the system of loss-compensation.

**Responsible leader:** Ms. Dr. Mária Magdolna Szabó

**Commissioner:** GKM Közúti Közlekedési Főosztály

**Starting and finishing dates:** 01.07.2003 – 15.10.2003

**Abstract:** EU accession requires the re-organisation of national regulation of the scheduled bus transport. The Community prohibits discrimination between suppliers, and they can only be obliged to provide public service tasks, which are undesirable and economically disadvantageous, subject to loss-compensation. Tendering of the suppliers within a given framework will be a basic requirement in the future in the Member States.

Research work aimed at the elaboration of EU harmonised regulation has been based on Council Decree 1191/69/EEC dealing with public transport services, and Community Regulation [COM(2002) 107] relating to public service requirements and public service contracts.

The proposed regulation, which has been elaborated at draft bill level, sets down the following: the state and local authority tasks related to ensuring the integrated public transport system, the responsibility of provision, regulations on the method of choosing the supplier, the administration of tenders, public service contracts, the order of public service obligations, loss-compensation, and the necessary transitional provisions. The bill, integrated into the system, deals with, and binds to uniformly special route permission, scheduled international passenger transport, non-contract-based special purpose scheduled domestic passenger transport, so-called cabotage passenger transport which is performed with lines replacing trains and non-domestic suppliers.

**Keywords:** passenger transport, public transport, public service.

**Ref. number:** 271-019-1-3

**Title:** Place and role of transport in the new energy policy.

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** GKI Energiakutató és Tanácsadó Kft.

**Starting and finishing dates:** 15.09.2003 – 20.10.2003

**Abstract:** *Energy consumption* decreased in the field of *transport-communication* up until 1993 in line with the amount of haulage and travelling performed, , and, with the exception of the outstanding results in 1996, has remained essentially stagnant ever since. It is also worth mentioning that the overall energy consumption of the transport and communication sectors following its 5.2% rate in 1990, shows a decreasing trend (it was 4.6% in 2001), which may also be explained by the ever increasing number of vehicles with lower fuel consumption.

In the 90-s, *logistics* began to function as a separate branch of the national economy, dealing with the management of transport, storing, packaging, customs clearance, documents, etc. It is not the rentability level of different transport modes (either individually or in relation to one another) which forms the modal split and thus the energy consumption, but the overall cost approach, according to which the user seeks to minimise the total cost of the production-sales process.

Energy consumption and pollutant emissions of vehicles follow the international trends. From 1980 onwards, specific fuel consumption (per 100 km) of passenger cars fell by between a third and a half. The Euro III norms are in force in the EU, and in Hungary, too. The introduction of the Euro IV is planned by December 2005, and the Euro V by 2008.

Several factors jointly influence to varying degrees and either temporarily or permanently the development of the Hungarian passenger transport market, and the changing travelling habits. Of these factors the following are the most important: 1. raising of living standards, 2. EU accession, 3. development of the infrastructure, 4. changing of regional relations, 5. changing ownership. With EU accession new tendencies can be expected to appear in the freight market; it is very probable that transport demand will increase provisionally (approximately by full integration). The loss-making position of railway transport can be brought to an end and the increase in the transportation of goods by road could be slowed down with the liberalisation of the railway tracks, and the introduction of shuttle trains. .

The demand for energy in EU transport up until 2020 can be influenced by the following factors: 1. revival of the railways (increasing its share, productivity, energy efficiency), 2. saturation of air traffic (competition between railway and air traffic should be transformed into supplementary co-operation), 3. development of waterway transport, 4. The introduction of a charge for use of the infrastructure (the EU hopes that by internalising the external costs road traffic will decrease, leading to an easing of the congestion problem), 5. harmonisation of fuel taxes.

**Keywords:** energy consumption, passenger transport market, PPP, goods transport market.

**Ref. number:** 271-020-1-2

**Title:** Elaboration of realisation orders necessary for the application of EEC decrees related to Community licences.

**Responsible leader:** Ms. Dr. Mária Magdolna Szabó

**Commissioner:** GKM Közúti Közlekedési Főosztály

**Starting and finishing dates:** 03.06.2002 – 28.02.2003.

**Abstract:** The program on law harmonisation has scheduled the access to the international market of road transport of goods and passengers, the regulation of the participation in domestic traffic of non-native entrepreneurs engaged in passenger transport, as well as the collation of the relevant community orders with domestic legislation for the second half of 2003. Application of decrees 881/92/EEC, 484/2002/EC, 684/92/EEC, 12/98/EC and 2121/98/EC by the day of accession does not only call for the revision of the existing system of authorisation, and the introduction in the domestic regulation of the Community documents required for services, but basically creates a new situation in the market. In contrast to the above, international freight road transport and contracted passenger transport becomes liberalised in the traffic of the Member States, and the suppliers have greater opportunities for carrying out scheduled international passenger transport, and the presence of suppliers from the Member States in the domestic passenger transport market also has to be counted on. These changes in the system of

conditions are presented by proposals elaborated for the amendment of the following orders: 89/1988.(XII.20.) MT, 14/2001.(IV.20.) KöViM, and 49/2001.(XII.22.) KöViM.

**Keywords:** freight market regulation, community licence, harmonisation.

**Ref. number:** 271-022-2-3

**Title:** UTINFORM screening and the elaboration of a proposal for the possibilities of setting up the Chief Inspection System.

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

**Commissioner:** GKM Védelemkoordinációs Főosztály

**Starting and finishing dates:** 16.07.2002 – 30.09.2003

**Abstract:** The main purposes of the project were the following: to elaborate a proposal on the establishment of the Chief Inspection System under the Ministry of Transport, its information system, and on the institutional system of its operation; to produce a cost estimate using the management data of the UTINFORM; and to prepare draft statutory provisions relating to different variants of the System.

The setting up of the Inspection System is justified not only by regulatory obligations, but also by the requirements of the Ministry's institutions for fast and valid information. Simultaneously, the System will also be appropriate for the provision of outward data service and contacts as required by law. For the establishment of the Inspection System, the organisational principle of ensuring efficient operation and smooth and transparent flow of information have been defined as the objectives.

Four variants have been considered according to which, either partly or completely new organisations could be established or integrated into the well functioning service agency of the UTINFORM. These variants were analysed and evaluated by using the SWOT analysis, taking both the advantages and disadvantages into account.

Staffing demands and costs of establishment and annual operation were determined in a breakdown by personal costs, expenses and expenditures. The separated, strictly department unit-related accounting would be practicable. This could form the basis of planned, controlled and real cost management.

For the operation of the 4 variants, draft statutory provisions have been prepared on the following lines:

- The establishment of the Central Inspection System,
- The management of the System,
- The starting and finishing dates of the System's activity,
- Commitments on data processing and information.

Furthermore, the financial resources of the Central Inspection System should be settled.

In parallel with the project the order of reporting on special incidents should be regulated.

**Keywords:** Chief Inspection, disaster prevention, information system, draft statutory provision.

**Ref. number:** 271-028-2-3

**Title:** Survey of the technical/operational practices and procedures employed by Hungarian railway operators in the process of border crossing within the framework of the *POLCORRIDOR* project.

**Responsible leader:** Árpád Tóth

**Commissioner:** T. Kosciusko Politechnika Krakowska

**Starting and finishing dates:** 30.10.2003 – 20.11.2003

**Abstract:** The task was to carry out the following analyses for the EUREKA Logchain *POLCORRIDOR* project:

- To identify the most important potential *POLCORRIDOR* clients in Hungary (railway companies, inter-modal operators, inter-modal terminals, terminal and IT suppliers)
- Organisational, operational and infrastructure solutions at Hungarian railways (organisational and operational structure, transport and traffic control, train capacity,

reservation/registration and sale – rules and terms, line services offered: traditional, shuttle-, direction-, wagon-load, dispatching, practice of line- distribution and integration, timetables and transit times for mixed and inter-modal (direction) trains on the lines concerned, information system (trace and tracking) data transfer between haulier – commissioner – inter-modal operator – addressee.

- Practice, rules and regulation of border crossing at the Austrian-Hungarian, Croatian-Hungarian and Rumanian-Hungarian borders (procedures of control and documents, average waiting time: customs check and border-crossing formalities and technical procedures, determination of bottlenecks impeding the smooth flow of goods on the Hungarian section of *POLCORRIDOR*)
- Detailed BILK analysis (including: capacity management, capacity reserves, average operation times, etc.)

**Keywords:** *POLCORRIDOR* project, practice of border crossing, line-sharing.

**Ref. number:** 271-034-1-3

**Title:** Survey of the possibilities for the application in Hungary of the results of the DESIRE (Design for Interurban Road pricing schemes in Europe) research project.

**Responsible leader:** Lajos Tóth

**Commissioner:** Gazdasági és Közlekedési Minisztérium

**Starting and finishing dates:** 31.11.2003 – 12.12.2003

**Abstract:** Having studied the currently operating and planned European road pricing systems of the years 1999-2000, the project was aimed at the basic idea of evaluating the efficiency of the European interurban road charges and providing guidelines for electronic fee collection schemes, and finally proposing solutions for the implementation of the problems. The study describes the project, and then in the light of the results examines the possibilities for its introduction in Hungary. Based on the available literature, it was discovered that the existing European road pricing systems are different and incompatible. Therefore, first of all common technical standards should be elaborated. After the survey of the technical and road pricing solutions, it was clear that in the short term the EU Member States and the neighbouring countries would not be able to operate according to a uniform, interoperable system. Currently, there is no single dominant system and those wanting to join the pricing scheme can, in principle, choose any solution, until such a time as a single European system is introduced. At the same time it would not be practicable for the newly acceding countries not to develop their own systems based on the already existing ones. Taking all this into consideration, introduction of the distance related network pricing system applied for heavy goods vehicles would be advantageous for Hungary, according to which in order to restrict detour traffic, some area-related fee collection elements should also be used. In the technical sense, introduction of DSRC technology would be practical, at least in the short term. From an institutional point of view, the elaboration of the Mixed scheme should be considered. This is a model with state and private competency.

**Keywords:** tolls, interoperability, electronic fee collection, vignette-system fee collection.

**Ref. number:** 271-043-1-2

**Title:** Survey and analysis of the financing system of the Integrated Transport Authority and elaboration of proposals on other financing system(s).

**Responsible leader:** Dr. József Pálfalvi

**Commissioner:** Közlekedési Főfelügyelet

**Starting and finishing dates:** 10.09.2002 – 31.03.2003

**Abstract:** An increasing number of the control tasks of the transport authority are closely related to Hungary's EU accession. There are two groups of EU-accession related additional control tasks to be carried out by the authority: there are tasks which were not supposed to be performed until now (e.g. control of the driving and resting times of drivers), and which had to

be fulfilled, but either the frequency of controls increased or new elements were involved (e.g. control of ships navigating on national waterways). Obviously, increased tasks require staffing and equipment development in all areas, particularly considering that there are several fields where no appropriate staff provision is available even for the accomplishment of the present tasks. Control tasks of the road transport authority appear in four fields:

- Traffic control (control of road transport service, operation, week-end and holiday traffic limitations),
- Technical control (road safety and environmental control),
- Surveillance of the carriage of dangerous goods,
- Control of social (labour) circumstances.

Totally new tasks, not performed before, emerge only in relation to social circumstances (AETR, 3820/85/EEC Council Regulation). Here, a significant increase in staff and the development of means (investment) are necessary. With regard to the other authority control tasks, it is mainly a question of expanding the relevant tasks, which will also entail an increase in staffing and greater investment.

**Keywords:** transport authority control, road controls, EU accession, observance of rules.

**Ref. number:** 271-046-1-2

**Title:** Comparative analysis of the activity and financing systems of the institutions of road network operation and maintenance in the EU Member States and Hungary, and a proposal for the updating of the Hungarian system.

**Responsible leader:** Dr. László Anda

**Commissioner:** ÁKMI Kht.

**Starting and finishing dates:** 15.10.2002 – 30.11.2003

**Abstract:** The project surveyed the ownership and financing systems of 8 EU countries (Austria, Belgium, Finland, France, The Netherlands, Great Britain, Germany and Sweden), and the structure of the institutions concerned with operation and maintenance. Essentially, the survey was aimed at offering some comparison between the EU and Hungary, and tried to offer proposals for the modernisation of the national system supporting the scheme of achieving EU accession with updated competitive organisations in the field of the road network also.

For reasons of cost efficiency, the survey was based on personal contacts, information obtained via the Internet, and reference source data, rather than on local site investigations. Nevertheless, the survey concerns a wide range of road network related activities of the different countries, and if necessary, references and Internet addresses provide for further information expansion possibilities. Based on the results of the comparative analysis, the following major remarks can be made regarding the Hungarian system.

In comparison with the EU countries, as a ratio of the length of the specific road network related to the territory of the country, Hungarian motorways are in a significantly inferior position. For example, in comparison with Austria, the state of preparation of the national road network is 78%, and that of the motorways just 26%. From the aspects of road network and road transport it is disadvantageous that most resources available for road construction and development are used for motorway construction. Although this is reducing the inferiority mentioned before, the unbalanced allocation causes a further deterioration in what is already a disadvantageous condition of another 29,000 km of the road network. For example, the rate of pavements in a bad or inappropriate condition exceeds 50% and 57% in the case of main roads and secondary roads respectively. On most secondary roads safe transport is impeded by inappropriate width. From the point of view of bearing capacity 13.4% of the main roads and 40.5% of the secondary roads are at the end of their useful life. From the aspects of width or bearing capacity 12.7% of road bridges fail to meet the requirements. The whole maintenance and renewal system is doubtful because the existence and application of the devaluating-amortisation system related to road network deterioration is missing.

In comparison with the EU countries, the ownership structure of the national road network is inappropriate. In accordance with the proposal concerning the modernisation of the current

system, the level of state ownership should be decreased, while that of the regions increased. After accession, the current situation will impede the development and independent management of the regions.

Revision of the ownership structure of the national road network also requires changes in the structure and activities of the agencies dealing with the road network. The existing central management should also be shared in this field. While retaining the role of the state in the domain of control and enforcement, as in the EU countries, part of the tasks and responsibilities should be transferred to the counties or regions, whereas, obviously the financing of these tasks should be ensured by the allocation of the income resulting from the road sector, and not on the basis of state distribution.

**Keywords:** road network ownership structure, road network operation, maintenance and financing, structure of institutional system, updating of the national system.

## ***Division of Transport System Research and Network Planning***

**Ref. number:** 212-063-2-2

**Title:** Continuation of extensive speed measurement on roads commenced in 2001; survey of different technical characteristics, of speed choice behaviour at temporary and permanent speed limits, and of speed-distribution.

**Responsible leaders:** Gábor Albert; László Czeglédi.

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

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Zoltán Vályi.

**Starting and finishing dates:** 13.05.2002 – 28.02.2003.

**Abstract:** The Division of Transport System Research and Network Planning of KTI organised numerous measurements in the outlying sections of the national road network throughout the year 2001 in order to make possible surveys of speed choice behaviour of motorists (car and truck drivers) . Due to the positive outcome of the results a decision was made to continue the measurements in a more extensive way in the national road network at suitable places chosen according to the aim of study, in concordance with a definite schedule in 2002. The final aim is to create an overall picture of speed choice behaviour typical on the national road system, which, on the one hand, accurately describes the current situation, and, on the other hand, might serve as a basis of comparison for similar measurements in the future.

The course of traffic velocity was studied for 3 to 5 hours each time, using *Nu-Metrics HiStar NC-97* counters. Results proved that this amount of time is sufficient for defining speed characteristics of traffic and also the effect of the volume of traffic on these characteristics.

A relationship has been found between speed choice and road category, number of lanes, width of lanes and hard shoulder, and the quality of optical driving. Certain regional effects and the impact of alignment are also described. There were certain factors (e.g. traffic composition) where results did not show a relationship with choice of speed.

The results will be extremely helpful in designing certain steps intended to affect speed, and to evaluate their expected success. Based on the positive results it can be stated that these measurements need to be continued, and choices of speed in special situations need to be examined.

**Keywords:** choice of speed, speed measurement, *Nu-metrics Hi-Star NC-97* counter, hard shoulder, optical lineation of roads.

**Ref. number:** 212-066-2-2

**Title:** Determination of the sequence of construction of the M9 motorway following the opening of the Szekszárd Danube Bridge.

**Responsible leaders:** Péter Miksztai; Gábor Albert.

**Commissioner:** NA Rt.

**Consultants of the Commissioner:** Lajos Hórvölgyi; Ms. Andrea Mikecz.

**Starting and finishing dates:** 15.05.2002 – 31.01.2003.

**Abstract:** A 20-km section of the M9 motorway between main roads № 6 and 51, which also contains a new bridge over the Danube near Szekszárd, was opened in 2003. This was a crucial step towards making up for deficiencies in crossing the River Danube. However, the role of this bridge can only be fulfilled with an interconnected road system.

The aim of the study was to observe the possibilities for the opening of further sections of the M9 with the maximum efficiency, regarding the exact timing, characteristics of construction, and time schedule. Our objective is to make a proposal to the arbitrator that is reinforced by figures and is well established professionally.

A model network using EMME/2 computer software was created to perform the examination, and this was used to carry out traffic assignments and a complex efficiency study. The closing date of the study is 2015, with intermediate examination timings set for 2006, 2008, and 2011. Altogether 15 network samples were studied thoroughly for each timing slot. Throughout the preparation of the studies we co-operated with the consigner, NA Rt. (National Motorways Ltd., Hungary).

We analysed expected traffic volume and changes to the previous condition in the case of each variant. The proportion of expected traffic volume, and the traffic volume which enables an acceptable standard of traffic flow in each section in all variants were calculated. The effect of development on the changes in journey times were also evaluated.

Throughout the efficiency study, the following characteristics were calculated and considered in the evaluation: investment costs, road maintenance costs, running costs of vehicles, journey time costs, losses at accidents arising from the number of people injured in accidents, emission of harmful exhaust gases, and noise burden.

Based on these facts a proposal of the most effective variant and its possible technical schedule were made.

**Keywords:** M9 motorway, Szekszárd Bridge on Danube, modelling, EMME/2 software, efficiency analysis, network development.

**Ref. number:** 212-069-2-2

**Title:** Theoretical basis for the definition and evaluation of traffic congestion, and the calculation of a threshold for intervention.

**Responsible leaders:** András Szele; Gábor Albert.

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

**Commissioner:** ÁKMI Kht.

**Consultant of the Commissioner:** Mrs. Csilla Szabóné-Kamarás.

**Starting and finishing dates:** 01.09.2002 – 30.05.2003.

**Abstract:** The aim of this study was to reveal the main characteristics of traffic congestion in the Hungarian road network, in order to provide an adequate theoretical basis for the creation of effective methods of congestion management, and for the definition of the point at which certain intervention arrangements must be made. A thorough study of technical literature and the available Hungarian traffic measurements made it clear that in this case we would have to rely on our own observations. Our measurements proved that most regular traffic congestion occurs in the suburban road sections of cities. Our studies were therefore conducted in a section of main road № 10 between Pilisvörösvár and Budapest and a section of main road № 4 between Vecsés and Üllő.

In addition to the technical and economic details, social and human effects of congestion were also discussed in detail.

General conclusions about the development of congestion situations and main characteristics of the phenomenon were drawn from the study. The most important results of the analysis are summed up in six points that describe the development and disintegration of congestion, certain characteristics and limit figures. A proposal was made for the use of the results in a cost benefit analysis of future interventions.

A possible system of congestion management on an experimental network was presented, with its running and technical costs compared to its advantages.

The results give a solid basis for the development of a strategy to minimise losses caused by congestion.

**Keywords:** traffic congestion, traffic density, road capacity.

**Ref. number:** 212-001-2-3

**Title:** Traffic workshare of Hódmezővásárhely Gardens and surrounding areas - detailed regulation plan.

**Responsible leaders:** Gábor Albert; András Szele.

**Commissioner:** CSOMITERV PLUSSZ Kft.

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

**Consultant of the Commissioner:** Szemerey Márta

**Starting and finishing dates:** 01.08.2001 – 30.06.2002.

**Abstract:** The traffic workshare of the regulation plan settled long-range questions of the city road network, and designated a lane for a future bypass road based on a future conception of transport development. Great emphasis was placed on the protection and defence of local characteristics. The section of main road № 47 to relieve traffic, currently under construction, is dealt with as an associated investment and an existing condition. We presented the expected rearrangements of traffic following the scheduled opening of road sections with detailed models. Proposed solutions will create the possibility for the development of a town centre which is well accessible but lacks through traffic. It will also enable the diversion of traffic around the city centre on concentric ring-roads, taking vehicle types into consideration.

Working out a solution for the parking area of a swimming pool and spa complex being built also played an important part throughout the planning task.

Implementation, depending on the financial state of the city, can be expected in the next ten years.

**Keywords:** Hódmezővásárhely, regulation plan, urban road network, plan of area structure, traffic modelling.

**Ref. number:** 212-002-1-3

**Title:** A simplified application of pavement management software *HDM III* on the main road network of Budapest using data available.

**Responsible leader:** Albert Gábor

**Contributors:** Péter Miksztai; Mrs. Jenőné Dr. Rimaszombati; Mrs. Istvánné Beszedics.

**Commissioner:** Budapest Főváros Önkormányzata, Főpolgármesteri Hivatal Közlekedési Ügyosztály

**Consultant of the Commissioner:** Ms. Zsófia Konyáry

**Starting and finishing dates:** 01.08.2003 – 20.11.2003.

**Abstract:** In 2001 KTI designed a comprehensive conception to develop a road surface management system. As a first step of the implementation, a road surface management procedure for the 500 km of city roads owned by the Budapest City Council was developed. The main aims were to show the possibilities, and to identify the need for a collection of data for developing a detailed system.

An estimate of the amount of investment needed for the targeted road conditions was prepared with the help of a preliminary pilot system in addition to the above mentioned aims.

During the development of the system, practical directions of the actualisation and amplification of the current road-data records became clear. These will enable a higher standard of service not only in road-surface management but also in numerous other fields. The consigner will rely on the professional aid of KTI throughout future data acquisition.

**Keywords:** *HDM-III*, pavement management system, Budapest.

**Ref. number:** 212-003-2-3 to 212-022-2-3

**Title:** Development of a system plan for controlling and processing software for FOKA 2 traffic counting data.

**Responsible leaders:** Ms. Mária Cseffalvay; Gábor Albert.

**Contributors:** DATAPIKE Consulting Kft.; Mrs. Istvánné Beszedics.

**Commissioner:** ÁKMI Kht.

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

**Starting and finishing dates:** 15.04.2003 – 30.11.2003.

**Abstract:** The FOKA system once used for cross-section traffic counting has become obsolete. Our task was to prepare a system plan for a new software which, by offering a wider range of services, will be suitable for controlling, correcting, processing and presenting results of cross-section traffic counting data from different sources.

Throughout the preparation of the system plan, on the one hand appliances currently used and certain characteristics of manual 'hand-counting' had to be taken into consideration, and on the other hand the possibility for future installations of interface programs of future counting appliances had to be created. The exceptionally complex error-seeking module contains decades of experience and ensures that only flawless data would be processed, which is indispensable for the reliability of preliminarily calculated data.

The system plan considers the individual needs of connected utilisation areas, and also ensures the simple actualisation of the future program system in the case of any change in the associated technical regulations. The established web-server architecture guarantees easy availability of the body for all users according to the established hierarchical structure.

**Keywords:** traffic counting, system plan, processing data.

**Ref. number:** 212-023-2-3

**Title:** The mid- and long-term modernisation of the existing main road network of the north-south economic axis and transportation corridor: sequence of implementation and technical contents.

**Responsible leaders:** Gábor Albert; Péter Miksztai.

**Commissioner:** Műszaki és Természettudományi Egyesületek Szövetsége, Szombathely.

**Consultant of the Commissioner:** Tamás Barna

**Starting and finishing dates:** 01.08.2003 – 31.01.2004.

**Abstract:** The task came about as a result of the urgent need for the improvement in the level of service of the north-south road transport axis (road № 86), which has an increasingly important national and international economic role.

The aim was the preparation of a program of action for an expedient implementation sequence and the most practical and effective technical content of certain slots.

As one part of the task so-called problem maps were drawn up on the basis of a detailed audit, to examine the current level of service and its external impacts. On the strength of these, expedient short-term interventions and technical content were specified.

The other important part of the task was the preparation of mid-term development and intervention proposals. A traffic modelling computer software (EMME/2) and complex associated algorithms of an efficiency study elaborated by our department were used.

Throughout the study different road -improvement variations were examined for 2010, 2015, and 2020, assuming diverse construction lengths and technical parameters.

Based on the study of efficiency of the many variants a proposal was made for an expedient implementation sequence.

**Keywords:** road network development, problem map, modelling, *EMME/2* software, study of efficiency.

**Ref. number:** 212-025-2-3

**Title:** Revision of the effect of traffic change due to the introduction of the toll system on the M7 in the Lake Velence region.

**Responsible leaders:** Gábor Albert; László Czeglédi.

**Commissioner:** UKIG

**Consultant of the Commissioner:** Tamás Sztaniszláv

**Starting and finishing dates:** 10.09.2003 – 30.11.2003.

**Abstract:** An action plan was prepared to counterbalance the harmful impacts of the traffic change in the Lake Velence section of main road № 7, as a result of the toll system on the M7

motorway. The revision of this plan was unavoidable for two reasons. On the one hand, only estimated data was available at the time of its preparation, and on the other hand, a number of new arrangements took place, causing further changes in the division of traffic. The four-day motorway sticker has been introduced, a 40 km/hour speed limit has been imposed on several built up sections of main road № 7, and a 7-ton limitation has also been decreed.

During the project a detailed traffic study was conducted, based partly on the latest data of traffic counting in this area, and partly on our own measurements. The scenes of the planned interventions were explored thoroughly, taking into consideration traffic safety, technical details, traffic characteristics, etc.

Based on this data, the proposed interventions were examined in detail. A proposal was prepared for the investment needs and their scheduling with regard to the needs of local councils, level of preparation of plans, and results of the analyses.

**Keywords:** Lake Velence, road safety, effect of introduction of toll system, standard of living, main road № 7.

**Ref. number:** 212-026-1-3

**Title:** The preparation of a road rehabilitation program ensuring a 115 kN single axle load by 2008, in association with EU accession.

**Responsible leaders** Gábor Albert, András Szele, László Czeglédi.

**Commissioner:** UKIG

**Consultant of the Commissioner:** Dr. Dezső Rósa

**Starting and finishing dates:** 16.09.2003 – 03.10.2003.

**Abstract:** The limit of a single axle load will increase to 11.5 tons on Hungarian roads following EU accession. Our roads were designed for a 10-ton single axle load, therefore it has become necessary to reinforce them. In accordance with an agreement with the EU, construction on 1800 km of roads will have to be completed by 2008 when the derogation expires. To counterbalance the difficult financial circumstances in Hungary, the EU will also provide financial aid. In order to secure the most efficient utilisation of resources, road sections had to be chosen and ranked.

The following preferences were pointed out by the consigner:

- Helsinki corridors do not belong to the subject of study;
- Roads to be reinforced should possibly be continuous and arrangeable in a series of projects;
- Expected and implemented developments must be taken into consideration;
- Possibly roads with the most traffic and/or in the worst state should be selected;
- A 'common solidity' of roads should be made out of main and secondary roads;
- Do not only consider reinforcement but also rehabilitation.

Roads were evaluated on a scoring system of 1 to 15 based on the load-wearing capacity set by the National Road Data Bank, and the condition of the roads. The sequence thus prepared helped to define the rank of the roads where intervention is recommended, based on the line view. 7,400 km of roads were examined. Bearing in mind the results, and following various stages of agreement, a road rehabilitation program covering approx. 1,000 km of roads and to be implemented by 2008 was prepared.

**Keywords:** rehabilitation, road surface reinforcement, EU accession, derogation.

**Ref. number:** 210-001-1-3

**Title:** Traffic conditions and transport behaviour before the opening of the Szekszárd Danube Bridge and the connecting road network.

**Responsible leaders:** Dr. Attila Vörös

**Commissioner:** UKIG

**Consultant of the Commissioner:** Ms. Mária Hamarné-Szabó

**Starting and finishing dates:** 01.06.2003 – 30.12.2003.

**Abstract:** Szekszárd Bridge was opened on July 3<sup>rd</sup> 2003. The new bridge is expected not only to bring into existence crucial network connections, but also to have an effect on regional and economic development, co-operation, and journeys which did not previously exist. It is a well-known fact that new road capacities offering a high standard of services encourage mobility. This means, in the case of passenger car traffic, that non-business traffic between settlements situated on both sides of the Danube will increase significantly. Business associated transport will flourish as businesses on both sides gradually discover each other. This study focused on the observation of these processes.

During the study a one-day-long survey and traffic count was held before July 3<sup>rd</sup> 2003 in the two bridgeheads of Dunaföldvár and Baja bridges. Motorists (car and truck drivers) were questioned about their destinations, causes and frequency of journeys. A traffic count was held simultaneously at 25 cross sections on roads leading to the two bridges and on roads connected to the then still unopened Szekszád Bridge.

On the two sides of the Danube Bridge under construction 1000 individuals and 300 businesses in 8 to 10 sample settlements were questioned about their travelling and transport behaviour before the opening of the new bridge.

After the opening, in August and in October 2003 cross-section traffic counting was repeated, including questioning and traffic counting in the three bridgeheads of the region.

Our aim is to have the data processing, analysis, and evaluation completed in 2004.

**Keywords:** generation of traffic, regional development effect, traffic count, network development.

**Ref. number:** 210-002-2-3

**Title:** Decreasing congestion at chosen points of the capital road system through traditional and innovative traffic engineering and control techniques.

**Responsible leaders:** Dr. Attila Vörös, András Szele.

**Commissioner:** Budapest Főváros Főpolgármesteri Hivatala, Közlekedési Ügyosztály

**Consultant of the Commissioner:** Tibor Janča

**Starting and finishing dates:** 10.09.2003 – 30.11.2003.

**Abstract:** Significant congestion has become regular on the main roads of Budapest. A low budget solution, improving traffic conditions but requiring the minimum possible construction, was sought by the City.

Traffic was observed mainly in the direction of Buda in a section of the “Nagykörút” between Podmaniczky Street and Moszkva Square, and, to a lesser extent, in the area around the intersections of Szilágyi Erzsébet Street and Városmajor Street, and Attila Avenue and Alagút Street.

The following problems and solutions were discovered:

- At some congestion sections less significant directions are treated more favourably than the main direction, thanks to traffic engineering or parameters. We propose the building of ‘intelligent’ intersections which watch emptying places on the driving-out side and let cars in according to a driving-out hierarchy. We named this method “Robocop” (Machine Policeman).
- The number of turnings should generally be decreased to increase the velocity and continuity of the traffic. Paradoxically, the less turnings there are in the system, the more cars can drive through it.
- The chances of exploiting unauthorised advantages should be ended. Therefore, we proposed the physical division of traffic lanes, the application of sign painting and constant observation of intersections, as well as clamping down on unauthorised parking.
- Further traffic engineering proposals include the co-ordination of traffic lights to a significantly lesser pace.

Our aim was to reduce the journey time between Podmaniczky Street and Moszkva Square to 20 minutes under all traffic conditions. The solutions proposed would increase the capacity by 10 to 15%, and ensure more reliable journey times.

**Keywords:** congestion, Budapest, Nagykörút, “Robocop” (Machine Policeman), intelligent traffic control.



## BOOKS, ARTICLES, LECTURES and PRESENTATIONS

### *Books*

**BOROS, Pál Dr. - FÜREDI, Mihály Dr.**

**100 éves a budapesti Erzsébet-híd.**

[Elisabeth-bridge in Budapest is 100 year old. A bibliography. In Hungarian.]

Kivonat: az ÁKMI Kht. megbízásából készült 2002. évi Hídbibliográfiának a budapesti Erzsébet-hídra vonatkozó tételei. Compiled by: Dr. Füredi Mihály.

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## Some Hungarian Acronyms

<b>ÁKMI Kht. / ÁKMI</b>	Állami Közúti Műszaki Információs Közhasznú Társaság Technical and Information Services on National Roads
<b>BM</b>	Belügyminisztérium Ministry of the Interior
<b>GKM</b>	Gazdasági és Közlekedési Minisztérium

	Ministry of Economy and Transport
<b>KHVM</b>	Közlekedési, Hírközlési és Vízgazdálkodási Minisztérium Ministry of Transport, Communications and Water Management
<b>KöM</b>	Környezetvédelmi Minisztérium Ministry of Environmental Protection
<b>KöViM</b>	Közlekedési és Vízügyi Minisztérium Ministry of Transport and Water Management
<b>KTE</b>	Közlekedéstudományi Egyesület Hungarian Society for Transport Sciences
<b>KTI Rt. / KTI</b>	Közlekedéstudományi Intézet Részvénytársaság Institute for Transport Sciences Ltd.
<b>KVVM</b>	Környezetvédelmi és Vízügyi Minisztérium Ministry of Environment and Water
<b>NA Rt.</b>	Nemzeti Autópálya Rt. National Motorway Ltd.
<b>MOL Rt. / MOL</b>	MOL Magyar Olaj- és Gázipari Részvénytársaság MOL Hungarian Oil and Gas Public Limited Company
<b>ÖMISZ</b>	Önkormányzati Útügyi Műszaki Információs Szolgáltatás Technical and Information Services on Local Roads
<b>UKIG</b>	Útgazdálkodási és Koordinációs Igazgatóság Road Management and Co-ordination Directorate

**Managing officers of the  
Institute for Transport Sciences Ltd.**

(December 31<sup>th</sup> 2003)

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(December 31<sup>th</sup> 2003)

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Closing date: December 31<sup>th</sup> 2003

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Berta, Tamás  
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Pálfalvi, József Dr.  
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Flórián, Gyuláné Mrs.

Gábor, Miklós

Janászek, Tímea Ms.

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Rimaszombati, Jenőné dr. Mrs.

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