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Annual Report 2005

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Contents

Editor's notes

The current edition details the most significant research work carried out by the institute in 2005. The chapters are arranged by the most important research topics.

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, lectures and presentations.

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*.

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

Budapest, July 17th, 2006.

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librarian
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SELECTED RESEARCH TOPICS

COMPLETED IN 2005

"Green cars", Vehicle Operation and Maintenance

Ref. number: 252-031-1-4
Title: Determination of the national, regional and local emission cadastre of road, rail and air transport in Hungary for the year 2003
Responsible leader: Dr. Tamás Merétei
Contributors: István Antal; Zsolt Antoni; József Kis; Zoltán Oláh; János Jaksa.
Commissioner: KvVM
Consultant of the Commissioner: Zsuzsanna Bibók
Starting and finishing dates: 2005 – 2005.
Abstract: Our task was to determine the emission inventory of the moving sources of sub-sectors of transport in Hungary for the year 2003. So, the quantity of important air pollutants (CO, CH_2, NO_2, SO_2, Pb, particle and CO_2) emitted was calculated, together with the exhaust gases of the power sources of the road, rail, air and waterway vehicles. Air pollutant emissions were determined for the whole territory of the country, for various counties and county seats, to 20x20 km rasters and for the Capital.
Specific emission factors of different motor vehicle categories (passenger car, truck, bus), the traffic volume and the road network data were used for the determination of the emissions of road vehicles. In the case of rail transport, calculations were based on the traffic of trains with diesel traction, the relevant rail network and the specific emission factors of diesel locomotives. For air transport, specific emissions of the LTO cycle (**L**anding, **T**axiing in/out, take **O**ff) specifying the ground and near-to-ground operations, the traffic of *Ferihegy Airport* and the characteristic airplane types provided the basis for calculations. As far as waterway transport is concerned, only the ship traffic of the *Danube*, the *Tisza* and *Lake Balaton*, and the length of the waterways were taken into consideration. Emissions were calculated by considering the fuel consumption determined on the basis of ship traffic and with the help of the specific emission factors, i.e. separately for goods and passenger transport. The table below shows the emissions in various sub-sectors and the summarised values for the year 2003:

Emissions caused by transport in Hungary in 2003 broken down by sub-sectors, and summarised [tonnes/year]

Harmful pollutants Transport sector	**CO**	**CH**	**NO_2**	**SO_2**	**Pb**	**Particle**	**CO_2**
Road transport	403490	55025	103097	1062	-	20745	10539292
Rail transport	978	320	4488	292	-	38,3	207303
Air transport	126	61,3	254,5	22,6	-	9,97	71030
Waterway transport	2215	1570	6442	177	-	481	370697
Total	**406809**	**56976,3**	**114281,5**	**1553,6**	**-**	**21274,27**	**11188322**

It can be stated that the role of road transport is determinant. If the data for 2003 are compared with the figures of the previous year, a decrease in CO, CH, NO_2, SO_2 and CO_2 emissions, and a slight increase in particle emissions can be observed.
Key words: air pollution, air pollutants, emission cadastre, emission factors, environmental protection.

Ref. number: 252-008-1-4
Title: Development of strategic environmental impact assessment procedures in accordance with the principles of sustainable development
Responsible leader: Dr. Tamás Merétei
Contributor: Mrs. Ágnes Mészárosné-Kis
Commissioner: GKM Környezetvédelmi Főosztály
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 2004 – 2005.
Abstract: The bases of the project were *Directive 2005/42/EC* on strategic environmental impact assessments together with the relevant Hungarian prescriptions, primarily *Government Decree 2/2005 (I.11.)*. The starting point was the experience gained through the strategic impact assessment of the Hungarian section of the Danube transportation corridor, important investments in the Hungarian motorway and that of major road network. As a first step, an overview was made of the interdependencies and differences of the strategic environment assessment and the environmental impact assessment. Thereafter, a general evaluation of the most recent international results of strategic environmental impact assessments for transportation was prepared. Accordingly, the principal statements of the European manuals and literature were summarised (more specifically the expert reports and proposals of the *BEACON* project and action programme *COST 350*).
A separate chapter deals with the Hungarian legal background, procedures and aspects as well as the expected effects of its implementation in the field of transportation.
The core of the study is a proposed methodology of the strategic environmental impact assessment in transportation. The proposed procedure, the essential requirements and means for the environmental evaluation, as well as the aspects of monitoring are described in detail.
A special chapter evaluates the indicators of the sustainability of transportation, and the criteria on which they were chosen and presents in detail the 16 proposed transportation/environmental indicators.
In the final part, a summarising overview is given on the results and statements of two Hungarian strategic environmental impact assessments:

1. Summary of the strategic environmental impact assessment of the Danube-corridor, joining the Trans-European Transport Network.
2. Environmental assessment of the long-term development plans of the important investments in the motorway and main road network.

Key words: transport infrastructure, environmental impact analysis, environmental indicators, sustainable transport, monitoring, *COST 350* Action Programme, *BEACON* project.

Ref. number: 252-006-2-4
Title: Air cleanness protection plan of the sustainable transport of Budapest and its agglomeration in conformity to the directives of EU integration. Phase II.
Responsible leader: Dr. Tamás Merétei
Contributors: Dr. Tibor Várkonyi; László Farkas; János Jaksa; József Kis.
Commissioner: GKM Környezetvédelmi Főosztály
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 2004 – 2005.

Abstract: The objective of Phase II of the project was the elaboration of the air cleanness implementation plan connected to the national programmes and the Budapest development schemes.
The air pollution due to transport in Budapest and its agglomeration is presented in detail. It was found that the basis of the implementation plan, leading to a reduction in the emissions of road vehicles and their operation, should be elaborated not according to the size of the polluted area, but the size of the exposed population. The strategic scheme and the short, medium and long-term elements of the implementation plan were elaborated.
In the elaboration of the strategic scheme of transportation air cleanness protection the basic aspect was the integration into the national and regional plans. Thus, the important strategic elements can be given as follows:

- The environmental policy should be an integral part of the land use and transport development, for this a good background is given by the extended implementation of the environmental strategic impact assessment.
- The share of the environment friendly public transport should be preserved; its network and level of service should be increased.
- The air pollutant emissions of road vehicle traffic should be further lessened by modernisation of the vehicle fleet, environment friendly operation, and the use of bio-fuels.
- Utilisation of the capacity of the transport infrastructure and equipment should be improved by the creation and extended implementation of informatics, transport organisation and intelligent transportation systems.

Thus, the influencing of personal decisions such as choice of workplace, choice of dwelling, car purchase and use, route choice, influencing in medium and long term has a fundamental role among the strategic elements of transport air cleanness protection.
Key words: EU integration, Budapest, agglomeration, emission decrease, sustainable transport, environmental protection.

Ref. number: 252-047-1-5
Title: Changes in road transport demand due to the accession of Hungary to the EU and evaluation of the environmental impact of leisure and tourist trips
Responsible leader: József Kis
Contributors: Dr. Tamás Merétei; István Antal; Zoltán Oláh.
Commissioner: GKM Környezetvédelmi Főosztály
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 01.03.2005 – 17.06.2004.
Abstract: The accession of Hungary to the EU resulted in the facilitation of border crossing with EU countries as of May 2004. This concerns the passenger car, bus and commercial vehicle traffic of the EU member countries, including Hungary. The change in traffic influences the environmental impact in the vicinity of the border crossing points (neighbouring townships) and on the roads and built up areas used by transit traffic.
The change in the road transport demand due to the accession of Hungary to the EU was evaluated by a presentation of the changes of the traffic of foreign and Hungarian vehicles on the national road network and at the border sections of Hungary. In this analysis, all relevant influencing factors which determined the traffic of the national road network before accession have been considered.
The effect of accession could be shown in both the motorway and main road traffic. Unequivocally, car traffic on the Slovenian, Rumanian and Serbian border sections, and commercial vehicle traffic on the Slovakian and Slovenian border sections increased as a result of accession; but the commercial vehicle traffic on the Austrian and Croatian border sections decreased. Accession did not influence the proportion of Hungarians and foreigners crossing the borders, with foreigners continuing to dominate. The monthly breakdown of the traffic on the

borders shows that the beginning of the changing tendencies is clearly linked to the time of accession; moreover, the change experienced in the year of accession proved to be lasting.
The increase in motorway traffic due to Hungarian accession resulted in a 2-3% nationwide increase in the emissions of the analysed exhaust gas components (CO, CH, NO_2, particle and CO_2). Traffic crossing built up areas near the border sections shows a 10-30% increase in emissions, compared to the same period of the year preceding accession. The situation concerning noise is better, i.e. the increase in noise emission due to the additional traffic caused by EU accession is less than 1 dB in the townships directly concerned.
Just as in the other EU member states, leisure activities and tourism are also important factors of the economy in Hungary. Moreover, leisure and tourism activity account for a significant proportion of the traffic on the Hungarian road network, though exact emission figures (noise and air pollution) have not yet been separately established.
The influential role of leisure and tourist trips has been determined by a comparison of the car and bus traffic on the borders, the weekday-weekend traffic on the border sections as well as the changes in the traffic of the national roads with major recreational traffic. Leisure and tourist trips account for 60-70% of the emissions of the traffic on the border sections, varying from section to section. The tourist traffic is greatest on the Austrian border section, and lowest on the southern border section. The proportion of buses in the analysed emission components (excluding particles) of leisure and tourist traffic is less than 6%. That is, in the case of emissions caused by leisure and tourist trips, cars dominate. In order to decrease the emission effects of the EU-accession and the leisure/tourist traffic, the earliest possible continuation of the existing motorway sections to the borders, achievement of the *M0 Ring Road*, payment of road fees by commercial vehicles according to emission norms, and the earliest possible construction of bypasses of townships in the vicinity of borders can be proposed.
Key words: environmental protection, EU integration, road traffic, tourist trips, leisure trips, harmful emission, noise emission.

Ref. number: 252-056-1-5
Title: Evaluation of the economic and technological implications, as well as those affecting environmental protection, of making use of used cooking-oil in bio-diesel production, and of mixing directly bio-ethanol with petrol, as well as making use of other regenerating fuels
Responsible leaders: Dr. Tamás Merétei; Zoltán Oláh.
Contributors: György Horváth; János Jaksa; Dr. Jenő Hancsók.
Commissioner: GKM Környezetvédelmi Főosztály
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 01.06.2005 – 12.08.2005.
Abstract: In compliance with EU directives (*30/2003 EU Council Resolution*), fuels on sale in individual countries should be of biological origin to some extent. The proportion shall reach 2.00% by the end of 2005 and 5.75% by the end of 2010.
Hungarian targets relevant to the traffic use of bio- and other regenerating fuels are laid down under item 3 of *Government Resolution 2233/2004(IX.22.)* accordingly.
The above Resolution has been prepared on the basis of the 8 May 2003 common *Directive 2003/30/EC* of the European Parliament and the Council referring to the promotion of the use of bio- and other regenerating fuels in transport. The Directive is adopted by *Government Resolution 42/2005.(III.10.)*.
The aim of the project was to survey the regulation of renewable energy sources to be used in transport, the legal background of processing used cooking-oil, and of manufacturing bio-diesel and bio-ethanol, as well as other bio-fuels. *EU Directive 2003/30* and *Resolution of the Hungarian Parliament (2233/2004.(IX.22.)* served as the basic principle for the introduction of bio-fuels in Hungary, and accordingly the necessary preparatory information documents and standpoints have been compiled, and the proposed measures elaborated.
In Hungary the weather conditions and the terrain are not favourable for the cultivation of rape, the most important raw material of bio-diesel, produced in large areas and with high average

yields in Western Europe. The sunflower, which is the second most important basic plant of bio-diesel, is produced in the largest areas and volumes in Hungary. In Hungary conversion of cooking-oils into bio-diesels could be very advantageous from environmental aspects, but, its current implementation on an industrial scale comes up against many obstacles (regular collection in big quantity; small and great consumers' will; etc.)

The sunflower is the oil-yielding plant produced in the largest area and volume, but is currently used primarily for alimentation purposes. Our weather conditions are excellent for the cultivation of sunflowers. It is drought-resistant, but for a good crop a favourable distribution and quantity of precipitation is needed. The oil-yield per hectare of rape is at its highest if there is abundant rainfall in spring and autumn, with high numbers of sunny hours between these periods.

At present, seeds for oil are produced on 600-650 thousand hectares, 12-13% of the total area. The harvested crop is approximately 900 thousand tonnes/year, of which 750 thousand are sunflower seeds (with an average crop of 1.5-2 t/ha). The oil content of sunflower and rape are 47 and 40%, respectively. The annual quantity of vegetable oil is 400 thousand tonnes, of which at least 100 thousand tonnes is produced as cooking-oil. Excluding exports, the maximum quantity to be used for bio-diesel production could be 250-300 thousand tonnes, of which a maximum of 200-250 thousand NOME could be manufactured. Ideally, of the 90-95 thousand tonnes of cooking-oil used domestically 30-35 thousand tonnes could be collected and 80-85% of this (25-30 thousand tonnes) could be re-used for the production of bio-diesel. Even according to Austrian examples the cost of production of bio-diesel is 160/170 HUF/liter.

Producing bio-diesel from cooking-oils could be important not only in Hungary, but worldwide. However, for industrial scale implementation, an appropriately large quantity of used cooking-oil should be collected regularly and, following due preparation, the necessary manufacturing capacities should be created for conversion, and bio-diesel manufacturing plant(s) existing or to be established in the future should also be properly equipped for the processing of cooking-oil.

The EU practice in handling used cooking-oil (and grease) was presented through project models.

Summary and comparison of technologies appropriate for the utilisation for transport purposes of used cooking-oil (and grease).

Estimation of the quantity of resulting used cooking-oil (and grease), assessment of the potentially utilisable/used cooking-oil handling capacities, analysis of the current system of institutional collection and handling in Hungary.

Determination of the quantity of used cooking oils and fats is possible on the basis of the data for the quantity of cooking oils used for alimentation. However, availability of the quantity of the used cooking fats to be recycled greatly depends on the willingness of collection of the given country/region. In the efforts to protect the environment of the EU and our country, the collection of used cooking oils and fats play an important role.

In Hungary there is a real possibility (considering the soil mulch and the weather conditions, as well as the technical-technological, the infrastructure background and the employment rate of the population) to produce bio-ethanol and consequently bio-ETBE. At present, from Hungary's point of view the most profitable raw materials: the sugar beet, but mainly the maize, possibly the wheat could be produced in such quantity and quality as they could be used for the manufacturing of water-free bio-ethanol to be used for engine propulsion.

There are two possible ways to use bio-ethanol in engine petrol: as additive to increase the octane number and to ensure the oxygen source or with the same purposes in the form of *bio-ethyl-tercier-butil-ether*. To this aim, however, at least partially, the structure of the agriculture shall be transformed and economic production of the plants serving as energy sources shall be solved.

Counting with Hungarian conditions the average production cost of one liter ethanol can be estimated to 125-135 HUF. This – without revenue tax – is not higher than the revenue tax added price of the methanol. According to plans, in Hungary as of August 2005 the petrol will be mixed with bio-ETBE produced in the refinery of *MOL Rt*. The bio-ETBE will be produced in a properly transformed former MTBE plant. Its capacity is 50,000 tonnes/year. (In

Tiszaújváros the *MOL Rt*. will build within the framework of a green-field investment another bio-ETBE plant by the end of 2007. Its planned capacity will also be 50,000 tonnes/year).
Of course, the engine fuel use of the bio-ethanol and bio-ETBE in Hungary requires a regulation compliant production. There is no Hungarian norm for water-free bio-ethanol; as for bio-ETBE, although no standard exists, the *MOL Rt*. elaborated its relevant quality provisions.
Analysis of mixing the bio-diesel and petrol; surveying the possibilities, the benefits and disadvantages.
Effects of present bio-ethanol and bio-diesel emissions and vehicle parameters to be measured on test bench, as well as their evaluation via cycle tests.
It can be stated that a 10-20% bio-diesel or bio-ethanol mix in gas-oil or petrol results in a negligible emission extent in regulated components and only a slight particle emission decrease, and fuel consumption increase can be shown due to bio-diesel addition.
Proposal for using other renewable fuels.
Key words: environmental protection, bio-fuel, bio-diesel, used cooking oil waste, renewable fuel, *EU Council Resolution 2003/30.*

Ref. number: 250-029-2-4
Title: Strategic Environmental Assessment of Long-term Motorway and Main Road Investments Program
Responsible leader: Mrs. Ágnes Mészáros-Kis
Commissioner: GKM – Road Development Department
Consultant of the Commissioner: Szilárd Ajtay
Starting and finishing dates: 19.10.2004 – 31.12.2005.
Abstract: The preparation of *Strategic Environmental Assessment* (*SEA*) of long-term motorway and main road investments program was carried out on the basis of *Governmental decree 2/2005*. SEA preparation involved consultations with employer's consultant, producer of the program and environmental authorities.
SEA was completed for 5 different variants and first of all the following indicators were taken into account: total length of network, external costs of air pollution, noise, accidents and crossing of *Natura 2000* areas. Information of the public has happened in newspaper, on website and in printed form.
Key words: environmental impact assessment, motorway investments, road investments, external costs, *Natura 2000* areas.

Ref. number: 250-032-2-4
Title: Preparatory activities to the Hungarian introduction of strategic noisemapping
Responsible leader: Sándor Hajdú
Commissioner: GKM – Innovation and Environmental Department
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 09.12.2004 – 31.01.2005.
Abstract: The goal is a supplementary noise test of the public transport's tramway, suburban railway and cog-wheel railway trains as part of the correction and supplementary activities in accordance with KvVM *Order № 25/2004.(XII. 22.)* on the detailed formal and content requirements and calculation and test methods in noisemapping.
As a result of the project, the entire surface fixed-track public transport will be able to be taken into account at strategic noisemapping.
Key words: strategic noisemapping, harmonisation, fixed-track public transport, noise emission, noise load calculation.

Ref. number: 250-001-2-4
Title: Duties in connection with the implementation of EU's noise policy
Responsible leader: Mrs. Dr. Pálné Bite
Commissioner: GKM – Innovation and Environmental Department
Consultant of the Commissioner: Dr. Miklós Szoboszlay
Starting and finishing dates: 15.01.2004 – 30.11.2005.
Abstract: Noise load values should be defined in accordance with the determination method included in European Parliament and *Council's Guideline 2002/49/EC* of 25/06/2002 on environmental noise evaluation and management. This method significantly differs from that used presently; an evaluation method that takes into account Hungarian peculiarities must be set up before the introduction. Until this is fulfilled, data provision obligations cannot be complied with.
According to *Guideline 2002/49/EC*, strategic noise maps on main roads (Average Daily Traffic>16,500 vehicles/day) and main railroads (>164 trains a day) must be prepared.
So far, the project included day- and nighttime strategic and conflict noisemapping and involvement table of motorway M3 in Q1 2005, and participation in the conferences about *Governmental Order № 280/2004. (X. 20.)*, held for railway and road experts.
In the final project stage, we prepared day- and nighttime strategic and conflict noise maps and involvement table of motorway M3, and the strategic noise map of motorway M5.
Key words: *Council Guideline 2002/49/EC*, noise protection, strategic noise map, conflict map, *Governmental Order № 280/2004(X. 10.)*, motorway M3, motorway M5.

Ref. number: 250-037-2-5
Title: 2005 operation of a nationwide noise monitoring system.
Responsible leader: Mrs. Dr. Pálné Bite
Commissioner: Magyar Közút Kht.
Consultant of the Commissioner: Ildikó Varga Ms; Sándor Sárközi.
Starting and finishing dates: 20.06.2005 – 31.12.2005.
Abstract: KTI has been measuring environmental noise load from road traffic at the measuring points of the nationwide noise monitoring system initiated in 1998-99 (20 points), plus 9 additional measuring points. This report sums up the results of measurements conducted in 2005. The purpose of the monitoring system is a half-yearly control of noise load along transit sections of settlements, evaluation of trends, and, if necessary, drawing attention to take required noise reduction measures.
The results of the performed work provide basic information on the noise situation at main roads for the municipal road management companies to take necessary measures.
Key words: noise load, monitoring, environmental protection.

Ref. number: 250-035-2-5
Title: Infrastructure Networks (Transport, Telecommunication, Energy, Public Utilities) in Hungary
Responsible leader: Mrs. Ágnes Mészáros-Kis
Commissioner: National Development Office
Consultant of the Commissioner: Ms. Anna Marjánovity
Starting and finishing dates: 01.12.2004 – 21.01.2005.
Abstract: Workshop was organized for famous experts of infrastructure networks with the aim to prepare a proposal for the *Hungarian National Plan 2* (2007-2013) based on the present trends and tendencies. The main topics of the workshop were the followings:
- Distribution of financial resources between different infrastructure networks.
- Analysis of the present situation; capacities, outputs.
- Accessibility, efficiency.
- Expected supply, tendencies.

Detailed Minutes of the workshop and Final Report were completed.
Key words: infrastructure networks, transport infrastructure, telecommunication, energy, public utilities.

Ref. number: 250-038-2-5
Title: Summary of noise measurement results of 1998-2003 and air pollution measurement results of 2000-2004 along main roads in the area of *Lake Balaton*
Responsible leaders: Mrs. Ágnes Mészáros-Kis; Sándor Hajdú.
Commissioner: Balaton Integration and Development Agency Kht, Siófok
Consultant of the Commissioner: Dr. Gábor Molnár
Starting and finishing dates: 01.07.2005 – 15.07.2005.
Abstract: The project goal was to study noise load and air pollution from road traffic in the settlements of *Balaton Holiday Area*. We summarised and evaluated noise measurement results of 1998-2003 and air pollution measurement results of 2000-2004 along main roads in the area of *Lake Balaton*. We compared them partially to traffic studies as well.
Measurement locations are indicated in maps, and measurement results in tables.
Key words: *Lake Balaton*, road traffic, air pollution, noise load, environmental protection.

Ref. number: 250-039-2-5
Title: Noise effect study on vibration strips constructed at 5 roundabouts along *Route 7* in connection with the construction of motorway M7 section *Balatonszárszó-Ordacsehi*.
Responsible leader: Sándor Hajdú
Commissioner: NA Rt.
Consultant of the Commissioner: László Gábriel
Starting and finishing dates: 26.07.2005 – 15.08.2005.
Abstract: We studied environmental noise effects of the vibration strips installed on the surface of the newly built roads in the area. Our goal was to find the extra noise amount generated by the vibration strips. Accordingly, we conducted measurements in each junction to analyse additional noise load.
Studies showed that extra noise load generated by the strips is not negligible. It has disturbing effects even at lower travelling speeds. The vibration strip, as an instrument to draw attention at speeds too high, is typically recommended outside of settlements.
Key words: road noise, monitoring, vibration strips, environmental protection, motorway M7.

Ref. number: 250-040-2-5
Title: Noise load study – at buildings in the vicinity of *Route 551* (to unburden Routes Baja 51-55), Section from 99+939,8-101+668 km to *Route 551*, Section 158+150-159-670 km.
Responsible leader: Sándor Hajdú
Commissioner: UTIBER Kft.
Consultant of the Commissioner: Zoltán Hegyi
Starting and finishing dates: 23.08.2005 – 19.09.2005.
Abstract: At the end of 2004, *Route 551* (to unburden Routes Baja 51-55), Section from 99+939,8-101+668 km to *Route 551*, Section 158+150-159-670 km was opened. The competent authority required measurements to be conducted before the final delivery process to illustrate noise situation. These measurements were performed by KTI, according to an approved measurement plan. The measurements were performed in 15 measurement points, which showed that noise load remains under the limit in all points but one. In the area where the limit is exceeded, the designer suggested to initiate a limit excess approval request process and to use passive protection.
Key words: road noise, monitoring.

Ref. number: 250-042-2-5
Title: Noise measurement in 6 points along motorway M7, Section *Balatonszárszó-Ordacsehi*, in operating state
Responsible leader: Sándor Hajdú
Commissioner: FTV Geotechnology, Geodetics and Environmental Rt.
Consultant of the Commissioner: Sándor Ocskó
Starting and finishing dates: 28.10.2005 – 30.11.2005.
Abstract: FTV Rt. charged KTI in 2005 with noise studies along motorway M7, section *Balatonszárszó-Ordacsehi* (125.3-145.0 km) in operating state as part of the *Environmental Monitoring Program*. These measurements were performed by KTI, according to an approved measurement plan.
The results of measurements in 6 points show that noise load remains profusely below the limits everywhere.
Key words: public road noise situation, monitoring, motorway M7.

Ref. number: 250-043-2-5
Title: Research on noise barrier elements made of used tyres
Responsible leader: Sándor Hajdú
Commissioner: Hungarian Environmental Association of Tyre Manufacturers
Consultant of the Commissioner: Dr. György Sinka
Starting and finishing dates: 15.11.2005 – 31.12.2005.
Abstract: Using old tyre grist as filling material for noise barriers has been an old and reasonable idea. This report summarises noise barrier construction solutions in acoustical terms and attempts to position barriers made of recycled tyres – which is a particularly environment-friendly solution – within this range. In order to do this, we determined noise absorption factor of used tyre granulate manufactured by GRANUFLEX Kft. of Hungary. The results showed that recycled tyre material may possibly be suitable to solve noise reduction/insulation issues: the results are encouraging.
Key words: recycling, recycled tyres, noise reduction, noise barrier.

Ref. number: 273-050-1-5
Title: Implementation of increased road and operation safety of a vehicle fleet run under rated conditions
Responsible leader: Dr. Tibor Gál
Commissioner: GKM Közlekedési Főosztály
Consultant of the Commissioner: Károly Pongrácz
Starting and finishing dates: 06.10.2005 – 15.12.2005.
Abstract: We elaborated the development elements of the databases necessary for passenger and goods transport on roads, and vehicle maintenance under rated conditions. On this basis the Transport Inspectorate will be able to carry out the necessary improvement of the databases *KÖZFEL* and *MEGAJAVA*. The tentative introduction of these updated databases will probably start as of January 2006.
Proposals have been prepared for the planning and implementation of those protection steps, which have to be taken primarily in the selection of the repairing stations.
In order to realise in the rated situation the traffic and operation safety of the vehicle fleet, a proposal has been made to ensure the technical level of the repairing bases.
Key words: rated situation, data base, traffic safety, repairing basis.

Ref. number: 273-053-1-5
Title: Improving the quality control of reusable component parts resulting from disassembling
Responsible leader: József Dabi

Commissioner: GKM Közlekedési főosztály
Consultant of the Commissioner: Károly Pongrácz
Starting and finishing dates: 06.10.2005 – 15.12.2005.
Abstract: The current situation and the provisions of the national rules were surveyed within the framework of the theme, with the aim to develop the quality control of the reusable component parts and units which were obtained during disassembling and are outstandingly important due to road safety and environmental protection reasons. From the aspect of necessary steps the list of the vehicle parts resulted from disassembling and subject to quality control has been revised. The general quality control aspects and requirements, the equipment necessary for quality control and the minimal level of the test sets have been determined.
Proposal has been prepared for the legal regulation of the measuring and testing activities resulting from disassembling, the improvement of the quality-control-related data communication activity, the regulation of the activity linked to components vending and sale.
Key words: disassembling, reuse, quality control, road safety, environmental protection.

Ref. number: 273-056-1-5
Title: Continuous elaboration of EU directives (*96/96/EC* and *2000/30/EC*) required for maintaining the harmonised laws on vehicles regarding the single vehicle test
Responsible leader: József Dabi
Commissioner: GKM Közlekedési Főosztály
Consultant of the Commissioner: Péter Barna
Starting and finishing dates: 06.10.2005 – 15.12.2005.
Abstract: Addressed to road safety development, to efficiency improvement and to as complete as possible harmonisation with international recommendations (*96/96/EC Directive, CITA recommendation, UN-ECE Regulation*) it has been revised the general technology of testing with regard to vehicles' pre-registration and periodic inspection.
For efficiency improvement – taking into consideration the practical experiences and the international recommendations – along with professional explanation, a proposal has been prepared for the revision of the theses of testing technology with road safety implications, suggesting amendments, modifications, and from the point of view of the vehicle's condition the detailed listing of the reasons of the mistakes.
Key words: testing technology, road safety, periodic technical inspection, harmonisation, *UN-ECE* regulation.

Ref. number: 273-067-1-5/1
Title: Collection of the brake force measurement results of the periodic inspections of M1 and N1 category vehicles; determination of the brake force limit values of sporadic vehicle types and the vehicle types of 2004
Responsible leader: Attila Tóth
Commissioner: Közlekedési Főfelügyelet
Consultant of the Commissioner: László Török
Starting and finishing dates: 30.09.2005. – 15.12.2005.
Abstract: The test operation of the M1 and N1 category vehicles' brake force limit curves has been performed. On the basis of the experience and further considerations the final limit curves have been prepared which also contained the time intervals of the new generation vehicle types that could be extended according to revision. Ten CD disks with final limit values have been submitted; consequently the deadline for the installation activities of the software manufacturers could be fulfilled. For fast and accurate execution of the limit curves, preparatory works to be made in the future years, the partial programmes of the previous years have been drawn together.
Key words: brake force limit curve, limit value, periodic technical inspection.

Ref. number: 273-067-1-5/2
Title: Elaboration of a measuring and data collecting system applicable within the framework of the periodic technical inspection of the airbrake systems of commercial vehicles with the improvement of the technological system used with buses
Responsible leader: Dr. Ottó Flamisch
Commissioner: Közlekedési Főfelügyelet
Consultant of the Commissioner: László Török
Starting and finishing dates: 30.09.2005 – 15.12.2005.
Abstract: It was accepted that at the beginning of the year within the framework of the project in accordance with the requirements a method and a computer controlled testing device would be developed for the inspection of the air brake systems, which entered into force by 1 March 2005. The task was carried out, and the measuring method, as well as the computer-controlled device was presented to the experts of the competent authority in KTI's laboratory within the framework of measurements executed on a bus. The *Közlekedési Főfelügyelet* (Hungarian Transport Inspectorate) approved the device. It was announced on the occasion of the presentation and in later interim reports that by the end of the year a radio sign-controlled airbrake system will also be produced. Here the pressure measuring sensors can be placed to the joints of the air brake systems, and the values measured, as well as the computer controlled messages on the opening and closing of the valves can be transmitted through transceiver systems.
The radio sign controlled system has also been prepared and KTI is ready to present it any time.
Key words: air brake system, radio sign controlled air brake, periodic technical inspection.

Ref. number: 273-067-1-5/3
Title: Elaboration of the variant of a complex inspection system for checking within the framework of periodic inspection of vehicles the structures to be used for the enhancement of technical safety (brake force, efficiency of ABS, ASR systems, operation of tachographs); its installation at the designated inspection station (systematisation of experiences, realisation of the manufacturing possibilities for the variant appropriate for the creation of the circumstances for usage).
Responsible leader: Dr. Ottó Flamisch
Commissioner: Közlekedési Főfelügyelet
Consultant of the Commissioner: László Török
Starting and finishing dates: 30.09.2005 – 15.12.2005.
Abstract: Surveying within the framework of periodic technical inspection the operation and accuracy of special safety devices containing also up-to-date electronic elements of sophisticated construction is definitely difficult, especially if the conditions must be ensured in the circumstances of a given technological area, or of moderate investment. All this taken into consideration, the methodology for checking retarders, speed limiters and anti-lock, anti-slip regulation systems has been proposed and elaborated in the previous and actual years, respectively.
Methodologies developed in the actual year can be integrated into the brake test procedure, which meets the harmonised technological requirements, when a minimum surplus time is demanded for carrying out the above-mentioned inspections, as well as for entering the results into a common report. The test hardware and the test programme as well as the experiments needed for the procedures and for the production of the final processes have been prepared, respectively. For the final methodology to be used, the electronic inspection of some products must still be analysed in order to choose the system that can be produced at lower cost.
Key words: periodic technical inspection, retarder, speed limiter, tachograph, anti-lock system, anti-slip system.

Ref. number: 273-067-1-5/4
Title: Exploration of procedures appropriate for evaluating within the framework of periodic inspection the road safety influencing technical characteristics of two- and three-wheeled vehicles.
Responsible leader: Attila Tóth
Commissioner: Közlekedési Főfelügyelet
Consultant of the Commissioner: László Török
Starting and finishing dates: 30.09.2005 – 15.12.2005.
Abstract: In the first step the test regulations on motorcycles have been explored. With concern to the subjects explored, supported by measurements, it was examined whether by using diagnostic equipment can the shock absorbers of two- and three-wheeled vehicles and tricycles (further on: motorcycles) be inspected.
Also on the basis of our measurements and the experience of commissioned examiners the problems of headlamp setting were explored and proposals made for solution.
Possible integration of motorcycles' brake measuring technology into the Uniform Brake Test Technology has been examined; requirements for test benches used for brake tests have been determined.
As for the other themes, test methods and requirements have been elaborated according to commissioned examiners' experiences, who were appointed to carry out motorcycle inspections. Motorcycles' inspection technology has been elaborated on the basis of the above.
Key words: motorcycle, two-wheeled vehicle, three-wheeled vehicle, four-wheeled motor tricycle, shock absorber, headlamp, brake measurement technology, periodic technical inspection.

Ref. number: 273-067-1-5/5
Title: Ensuring the expertise background for the conformity test of checking the devices used in the course of official vehicle inspections
Responsible leader: József Dabi
Commissioner: Közlekedési Főfelügyelet
Consultant of the Commissioner: László Török
Starting and finishing dates: 30.09.2005 – 15.12.2005.
Abstract: The theme was aimed at the elaboration of checking within the framework of periodic technical inspection the braking system of trailers equipped with overrun brakes, as well as at the determination of the necessary changes to be introduced on the basis of the experiences gained during the brake test of buses in accordance with *EFT 1.1* (Uniform Brake Test technology), and the air brake test of buses engaged in international traffic. Surveying the requirements on the brake test to be carried out on roller braking force measuring test bench of trailers with overrun brakes and the brake operating devices needed for the test, there were specified the characteristic data necessary for periodic inspection, the requirements on the device simulating the overrun, the remarks and proposals on the procedure of measuring and evaluation. Different variants characteristic for the actually used simulators have been described.
Findings of the bus tests carried out on roller brake force measuring test bench, and evaluating the operation of the air brake systems have been elaborated, and proposals prepared, accordingly.
Key words: overrun brake, periodic technical inspection, trailer, bus.

Ref. number: 112-001-2-5
Title: EU and UN-ECE related background activities linked to technical safety regulations concerning road vehicles
Responsible leader: Sándor Szabó
Commissioner: GKM

Consultant of the Commissioner: Károly Pongrácz
Starting and finishing dates: 30.04.2005 – 01.12.2005.
Abstract: Based on international agreements, uniform technical requirements are laid down in Europe on road vehicles for the improvement of road safety, environment, energy efficiency and against unauthorised use of vehicles. This way, the obstacles of trade are eliminated and the international transport of persons and goods is facilitated. Being a party of the international agreements, Hungary by legislation based regulations (№s. *5/1990* and *6/1990*) as pre-requirements for vehicle type-approvals or authorisation of motor vehicles' first entry into service, stipulates the EU Directives' technical requirements on motor vehicles (most harmonised with *UN-ECE* regulations).
Initiated by the Road Transport Department of the Ministry of Economy and Transport, the *Technical Co-ordination Centre for EU and UN-ECE Activities on Road Vehicles* (EKK), which has been organised in the KTI, in 2005, carried out the following activities:
- Monitored the elaboration and the adjustment activities linked to technical development in the field of EU directives and UN regulations in service of the Ministry's national legislative responsibilities.
- In 2005 three forums were held with the involvement of partner authorities, institutes, companies, etc. in order to harmonise the different information and standpoints.
- The expert of the Centre three times in a year participates and reports on the WP.29 World Forum sessions.
- In 2005, on 13 occasions, the EKK held such roundtable meetings, when the participants of the EU groups of experts have been prepared in order to represent the harmonised Hungarian standpoint.
- The EKK made all the EU and *UN-ECE* regulations as well as the reports of the EU and ECE working groups available in English and Hungarian on the KTI's homepage (www.kti.hu).
Key words: harmonisation, international co-operation, European Directives, *UN-ECE* regulation, global technical regulation.

Information dissemination, marketing

Ref. number: 306-001-5-1
Title: KTI Kht. – ÖMISZ co-operation.
Responsible leader: Dr. Mihály Füredi
Commissioner: Magyar Közút Kht.
Consultant of the Commissioner: Tibor Zupán
Starting and finishing dates: 2005.01.01. – 2004.11.30.
Abstract: This cooperation between *Magyar Közút Kht*. (formerly: *ÁKMI Kht.*) and KTI has multiple objectives:
(a) give informative (and marketing) presentations for the representatives of local governments about available modern IT possibilities and about the support and free services provided by KTI for local governments within the framework of this co-operation;
(b) documents, professional materials received by Magyar Közút Kht's library are processed by KTI's library, and listed in KTI's s own library automation system with a special differentiating mark;
(c) basic information related to ÖMISZ and documents registered in Magyar Közút Kht.'s library are published by KTI on its website (www.kti.hu);
(d) professional translations of documents requested by associates of Magyar Közút Kht. are prepared upon request as well as translation of the quarterly ÖMISZ newsletters;
(e) free documentation and information service is provided for the participants of the ÖMISZ program (primarily for the representatives of local governments), as well as access and professional assistance in translation for searching and utilizing the databases on TRANSPORT CD, including ITRD and TRB, as well as the TRIS, TRANSRECH and EBSCO databases, available only in foreign languages.
Key words: information dissemination, *ÖMISZ*, transport policy, transport economy, transport safety, *Transport CD*, *ITRD*, *TRB*, *TRIS*, *EBSCO*.

Roads and Bridges

Ref. number: 245-902-1-5
Title: New road construction and maintenance techniques in Europe (*NR2C* project)
Responsible leader: Dr. habil. László Gáspár
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Gábor Ercsey
Starting and finishing dates: 01.08.2005 – 01.04.2006.
Abstract: The experts of various European countries – including Hungary – have carried out *NR2C*-project entitled „*New road construction and maintenance techniques in Europe*", funded partially from the Sixth Research and Technological Development Framework Programme of the Commission of the European Communities since 2003.
The main goal of the research co-operation, planned for 4 years, was to develop European-wide new road construction principles. For this reason, the vision of road traffic up until 2040 was compiled, then the major technological innovations of the countries participating in the project were gathered in three areas (urban roads, rural roads and engineering structures), and finally some selected research works were carried out during the *NR2C* project, which were considered as major steps towards the reaching of the distant vision.
The road traffic vision entitled „*Europe in 2040*" was compiled using three extreme scenarios during six national round tables. In the project, the highway innovations of 30 European countries were gathered by means of a questionnaire survey.
Key words: international co-operation, road construction techniques, road maintenance techniques, *NR2C* project.

Ref. number: 245-908-2-5
Title: Specification on haulage roads of motorway construction
Responsible leader: Dr. habil. László Gáspár
Commissioner: UKIG
Consultant of the Commissioner: Tamás Berg, UKIG; Balázs Mentes, NA Rt.
Starting and finishing dates: 15.05.2005 – 31.08.2005.
Abstract: The construction of Hungarian motorways needs the haulage of high volume materials. During this transport, the haulage roads are highly loaded for a long time, and thus often deteriorate. The theme report includes recommendations on the rights and the obligations of motorway contractors in relation to the haulage roads. The transport of construction material (e.g. soil) can only be started on roads of at least average condition. The contractor also has to take care to avoid poor pavement condition during haulage. After the completion of the motorway construction, the deteriorated road has to be rehabilitated (reconstructed). The report includes the actual condition levels for surface defects and pavement bearing capactiy to be reached in various phases of the motorway construction.
Key words: motorway construction, haulage roads, road surface defects, road bearing capacity, pavement rehabilitation.

Ref. number: 245-905-1-5
Title: Long life pavements (*ELLPAG* project)
Responsible leader: Dr. habil. László Gáspár
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Gábor Ercsey

Starting and finishing dates: 01.08.2005 – 01.04.2006.
Abstract: Since the efficiency of road pavements is closely connected with long service life, the experts of several European countries formed the *ELLPAG* (*European Long Life Pavement Group*). Its main aim is to compile European experiences on design construction, rehabilitation, maintenance and economic calculations, then, in a later phase, the establishment of a guide on the relevant best practices is planned. Furthermore, areas of the topics requiring further research (knowledge gaps) are also identified. The first phase of the activity concentrated on flexible pavement types, while phase 2 dealt with semi-rigid pavement structures. The third phase, the investigation of rigid pavement structures, has not yet been completed.
Key words: long pavement life, flexible pavements, semi-rigid pavements, road construction, *ELLPAG* project.

Ref. number: 245-906-1-5
Title: Research on the condition evaluation and long life of asphalt pavements
Responsible leader: Dr. habil. László Gáspár
Commissioner: Magas-, Mély- és Útépítő Vállalat
Consultant of the Commissioner: Zoltán Puchard
Starting and finishing dates: 05.05.2005 – 01.10.2005.
Abstract: The report presents the major parameters influencing road deterioration, then the different meanings of pavement life are introduced. It analyses the past 10-year time data series of a major condition parameter, the longitudinal unevenness expressed in IRI on the Hungarian national motorway network. A significant deterioration has been detected in the secondary road network.
The report deals with the relationship between the PSV (polished stone value) and other condition parameters of road aggregates. Finally, it summarises the main results of the activity of the ELLPAG-expert group, which deals with long life road pavements.
Key words: asphalt pavement, pavement life, unevenness, road construction stones, long life pavement, *ELLPAG* project.

Ref. number: 245-907-2-5
Title: Elaboration of the secondary network element of the *National Road Rehabilitation Programme*
Responsible leader: Dr. habil. László Gáspár
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Dr. András Gulyás
Starting and finishing dates: 05.06.2005 – 30.11.2005.
Abstract: Over the past decades, only a small portion of the real financial resources were used for the maintenance and rehabilitation of the non-expressway sections of the Hungarian motorway network. For the counteracting of the general pavement deterioration observed, KTI carried out the preparatory activities for the *National Road Rehabilitation Programme*, then the institute compiled its secondary network element.
The performance indicator levels connected with the availability of pavement, width and condition, which are different for motorways, main roads and secondary roads, were determined. These levels should be reached on the relevant network parts by the end of the 10-year rehabilitation period. In the priority listing, the need for widening usually had priority – except for the very poor condition – against the condition improving interventions due to the major traffic safety implications of the former technique. The paving of actual earth roads is planned only for the end of the period, initially in the counties with greater traffic volume. When establishing the project lists, a nearly uniform yearly financial load is planned for the 10-year period.
Key words: asphalt pavement, pavement life, pavement performance indicators, unevenness, road construction stones, long life pavement, *National Road Rehabilitation Programme*.

Ref. number: 245-906-2-5
Title: Trial section monitoring for road management
Responsible leader: Dr. habil. László Gáspár
Contributor: Tibor Bors
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Ms. Veronika Forrai-Hernádi
Starting and finishing dates: 15.05.2005 – 30.11.2005.
Abstract: Some 60 trial sections, each of 500 m in length, selected from the Hungarian state motorway 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 of the whole network – differentiating 14 road section types – from the view-points of traffic volume, pavement structure type and subgrade bearing capacity.
The results of the fifteen years of trial section monitoring carried out so far have made it possible to develop more and more accurate pavement 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.
Key words: pavement condition survey, trial section, pavement deterioration, pavement performance model, PMS - pavement management system.

Ref. number: 245-003-2-5
Title: Quality control of the furnace slag of the motorway M6, section between *Érd* and *Dunaújváros*
Responsible leader: Dr. habil. László Gáspár
Contributor: Zsolt Bencze
Commissioner: M6 Autópálya Építési Kht.
Consultant of the Commissioner: Ms. Veronika Betz
Starting and finishing dates: 05.05.2005 – 01.10.2005.
Abstract: A considerable part of the high volume embankment of the M6 motorway section between *Érdi tető* and *Dunaújváros* was built using furnace slag from *Dunaújváros*. The task facing KTI was to perform bearing capacity and density tests in the frequency specified in the relevant standards.
After the regular sampling of the slag deposits in *Dunaújváros*, detailed mechanical and chemical investigation were carried out. Based on the test results, the use of industrial by-products or the eventual correction measures were decided.
KTI carried out sampling, quality tests and evaluation, and also provided expert opinions in relation to various trial sections.
Key words: motorway construction, embankment, blast furnace slag, quality control.

Transport Organisation, Network Planning, Logistics

Ref. number: 212-056-1-4
Title: Analysis of general regulation and fitting into the planning process of plan reviews, their harmony with construction licensing and European Union regulation
Responsible leaders: Gábor Albert; Éva Hingyi.
Contributor: Mrs. Istvánné Beszedics
Commissioner: GKM
Consultant of the Commissioner: Szilárd Ajtay
Starting and finishing dates: 01.08.2004 – 30.06.2005.
Abstract: In the first phase of the project, the juridical regulation relating to the transport network planning process in the fields of transportation, land use and environmental protection was explored in detail. Thereupon, the contact points which yield support for a new regulation of reviewing transportation plans could be defined.
Consequently, a document was prepared for discussion by experts, and a committee of experts set out the principal directions of further activities in several session periods, concerning the scope and means of the regulation, as well as its necessary level and the circumstances of its introduction. Thereafter, a final document was prepared, containing background analyses, and providing proposals for a multilevel regulation according to the basic principles set out by the committee. One of its domains is road design (regulations: "*KTSZ*", "*ÚT-2-1-201:2004*"), and the other is *Act I/1988* and its Decree of Execution. The results of the task can appear in the growth of the efficiency of the transport network planning in case of the adoption of the proposals, i.e. introduction of the new regulation.
Key words: construction licensing, traffic safety, value analysis, road network planning.

Ref. number: 212-067-1-4
Title: Advisory activity to the preparation of the transport situation analysis and strategic documents Europe Plan for the period 2007-2013.
Responsible leaders: Gábor Albert; András Szele.
Contributors: Csaba Erdélyi; Mrs. Istvánné Beszedics.
Commissioner: GKM
Consultant of the Commissioner: Mrs. Éva Geiszhauer
Starting and finishing dates: 19.01.2005 – 31.05.2005.
Abstract: The experts of the KTI co-operated in the subjects set out in the work plan by systematic consultations in creating strategic documents for the Commissioner. During the course of this, several working documents embracing the entire field of transportation, including the logistical systems, were reviewed.
In the preparatory phase of the task the transportation network development practice of several countries was presented and evaluated. It served as a base for establishing a network development priority system including all Hungarian transportation branches, with emphasis on their present situation and the accepted directives. Beside the principal directions, the system of interventions, allowing effectively the achievement of the objectives, was elaborated.
As a conclusion to the advisory tasks, a written document was prepared, summarising the results obtained, and supporting the eventual ulterior detailed activities. It contains most of the background documentation utilised.
Key words: *Europe Plan*, transport development.

Ref. number: 212-068-1-4
Title: Capacity of the Hungarian transport network and analysis of its traffic tendencies
Responsible leaders: Péter Miksztai; Gábor Albert.
Contributor: Mrs. Istvánné Beszedics
Commissioner: GKM
Consultant of the Commissioner: András Tóth
Starting and finishing dates: 08.03.2005 – 25.05.2005.
Abstract: We surveyed the actual transport situations of the national road network based upon the existing traffic count data.
Using the *National Road Data Bank*, those road sections were defined, mainly on the main roads, where traffic volume currently exceeds the acceptable level of service. Using traffic-forecasting multipliers, road sections where the traffic will be higher than the acceptable level of service in 5 and 10 years, respectively were sought. Emphasis was placed on the urban thoroughfares.
In the second part of the task the exploitation of the running line and station capacities of the suburban rail traffic (*MÁV*, *HÉV*) was analysed, including travel speeds. In the vicinity of Budapest, the traffic tendencies and bottlenecks were analysed.
The possibilities of increasing demand for the suburban rail transport system were analysed (P+R parking, complementary bus network, etc.).
Key words: road network, road capacity, *National Road Data Bank*.

Ref. number: 212-069-1-5
Title: Effect of the increasing permeability of the borders of the traffic of Hungarian road sections in the vicinity of the borders – elaboration of a study
Responsible leaders: András Szele; Gábor Albert.
Contributors: Csaba Erdélyi; Mrs. Istvánné Beszedics.
Commissioner: UKIG
Consultant of the Commissioner: Mrs. Zsuzsa Haraszti; Zsolt Boda.
Starting and finishing dates: 31.03.2005 – 15.12.2005.
Abstract: In the coming years, as a result of the disappearance of the borders and/or the continuous diminution of their significance, it may be that a part of the Hungarian inland traffic will actually run on roads of neighbouring countries, not used until now for this purpose.
The same is true, of course, vice-versa: between *Bratislava* and *Košice* the Hungarian motorway network currently provides the possibility for highest standard and quickest road travel. Reviewing the situation it was found that on the interior borders of the EU such route alternatives exist mostly on the rather zigzagging Hungarian-Slovakian and Hungarian-Austrian borders.
At the same time, on some parts of the Slovakian border – e.g. between *Esztergom* and *Komárom* – the greatest difference is the nearly exhausted capacity on the Hungarian side.
An important aspect of the problem is what real demand can be found behind the existing route alternatives.
The principle results of the analysis are:

- Traffic diverted into Hungary from neighbouring countries does not exceed the level requiring intervention anywhere.
- Traffic diverted from Hungary will probably not be of a level where investments could be postponed anywhere.
- In the following relations the use of the road network of neighbouring countries can be advantageous:
    - between *Esztergom* and *Komárom;*
    - between *Komárom* and its region, and *county Nógrád;*
    - between *Miskolc* and *Salgótarján;*
    - between *Kőszeg* and *Sopron*.

- In the following relations the use of the Hungarian road network will be advantageous for neighbouring countries:
    - between *Bratislava* and *Košice;*
    - between *Felsőpulya* and *Boldogasszony*.

Key words: border crossing points, traffic diversion.

Ref. number: 212-070-1-5
Title: Mitigation of the transportation problems of the *Central Region* using intelligent transportation methods – elaboration of a proposal for investment and implementation
Responsible leaders: András Szele; Gábor Albert.
Contributors: Mr. Csaba Erdélyi; Mrs. Istvánné Beszedics.
Commissioner: UKIG
Consultant of the Commissioner: Mrs. Andrea Szénási
Starting and finishing dates: 31.03.2005 – 15.12.2005.
Abstract: The study dealt with the *ITS*-possibilities of displaying travel times and lessening speeds in the agglomeration of Budapest. In both subjects several methods are presented, concerning the characteristics, impacts, costs of installation and the expected effects of the intervention. In all cases installation sites are proposed. Principle statements of the study are:
Concerning displaying travel times:

- There are *ITS* methods for measuring and displaying travel times. Implementation costs of such systems may be less than 10 million HUF.
- Expected acceptance of the considered methods is usually positive, but the profession is less enthusiastic about such investments for increasing the level of service, because of weak political support.
- Several roads can be found in the Budapest agglomeration with the possibility and demand for displaying travel times and lessening speeds.

Concerning lessening speeds:

- Introduction of most *ITS*-methods for lessening speeds would probably meet serious disapproval from the public.
- Therefore, those methods should be further investigated where the recommended means of lessening the speeds is not meant as a punishment, but rather at losing the time gain ("punishing light").
- Utilisation of registration plate identifying cameras supplies solutions for both problems.

Key words: *ITS*, speed display, displaying of travel time, speed lessening, registration-plate identification.

Ref. number: 212-078-2-5
Title: Regional survey between *Letenye* and *Berzence* concerning the opening of a new border crossing point, possibly on a main road or expressway
Responsible leaders: András Szele; Gábor Albert.
Contributors: Csaba Erdélyi; Mrs. Istvánné Beszedics.
Commissioner: UKIG
Consultant of the Commissioner: Mrs. Zsuzsa Haraszti
Starting and finishing dates: 10.05.2005 – 07.11.2004.
Abstract: The principal results of the study are:

- Before the accession of Croatia to the Union and *Schengen*, the opening of a new border crossing is not realistic.
- It was found that a more southern alignment of the section between *Nagykanizsa* and *Kaposvár* (more exactly *Nagykanizsa - Kutas*) can be proposed.
- The principal component of regional exploring effect is the approaching of towns *Csurgó* and *Nagyatád* with a motorway.

The demand for opening new border crossing points between *Letenye* and *Berzence* on the Hungarian-Croatian border has emerged at several places, and the leaders of the local townships repeatedly raised this demand following the Yugoslavian crisis.
The Croatian side are preparing the plans of a road from *Zagreb-Kapronca-Hungary*. The border crossing point of this road has not yet been fixed.
It came to light during the collation with the Croatian side that the parameters of the planned *Zagreb-Kapronca* motorway meet those of the Hungarian motorway category. As far as the time of realisation is concerned, it is known that this road will not be built before 2008.
Key words: border crossing points, motorway M9.

Ref. number: 220-021-1-4
Title: Preparation of a professional preparatory proposal for a decree containing the provisions set out in *Directive 2003/59/EC* of the Council and the Parliament concerning refresher courses for motor vehicle drivers
Responsible leader: Mrs. Miklósné Szilágyi
Commissioner: GKM
Consultant of the Commissioner: András Kopiás
Starting and finishing dates: 07.06.2004 – 01.05.2005
Abstract: Fitting the EU Directive concerning the basic and refresher courses of professional motor vehicle drivers into the national legislation, made it necessary to elaborate the related training material and topics, as well as their fitting into the related government level regulation. The professional preparatory work was finished by the administrative collation and approval by the government of the draft prepared according to the results of the research. According to the research contract, the proposals had to be refined taking into consideration remarks on the requirements of the Commissioner which arrived in the meantime, by May 2005.
Key words: professional motor vehicle drivers, drivers' education.

Ref. number: 220-039-1-4
Title: Preparation of documents summarising the activities of working committees of the EU on combined transport and logistics, as well as for the analysis forming the basis of international contracts
Responsible leader: Mrs. Miklósné Szilágyi
Commissioner: GKM
Consultant of the Commissioner: Dr. János Verbóczky
Starting and finishing dates: 25.10.2004 – 28.04.2005
Abstract: In accordance with the transport policy objectives of the EU, Hungarian transport policy also wishes to promote the stronger development of transport branches less damaging to the environment (rail, inland waterways, combined transport). Implementing measures to promote the transportation of goods by rail or in a combined mode, instead of by road, necessitates decisions not based at the community level, but rather at the national level.
Participation in the activity of the work committee on combined transport and logistics and the European Commission requires a well founded and circumspect work for which a wide range of data collection and evaluation is necessary. Comprehensive documentation on combined transport was prepared according to the demands of the Ministry, and, in addition, we also completed background documentation for international agreements and contracts, and performed translations and background institutional tasks.
Key words: combined transport, environment friendly haulage modes.

Ref. number: 220-038-1-4
Title: Effect of the seasonal changes of passenger traffic of urban bus transport on the efficiency of the operation, elaboration of proposals for mitigating the disadvantages
Responsible leaders: Dr. István Zsirai, Mrs. Endréné Trepper.
Contributor: Lajos Vass
Commissioner: Szabolcs Volán Rt.
Consultant of the Commissioner: László Ignácz
Starting and finishing dates: 05.10.2004 – 05.03.2005
Abstract: Passenger transport demands show great changes in time and space in urban traffic. The task of the present research is the analysis of the temporal changes and determination of the effect on the efficiency of the operation and elaboration of proposals for mitigating the problems arising.
Among the temporal changes of the urban traffic appear:
- Seasonal fluctuations (winter, summer, school period, school holidays, etc.).
- Weekly fluctuations (work days, Saturday, Sunday, others).
- Daily fluctuations (traffic peaks, non-peak hours).

In course of the research – relying upon the wide information-basis on urban passenger transport fluctuations of our Department – an evaluation methodology of traffic fluctuations, the principles of setting up a target-oriented information-basis of their analysis, and methodology for the rationalising of networks and schedules that take into consideration the effects of the fluctuation and eliminates its negative phenomena, were elaborated.
To prove the applicability of the methodology the comprehensive seasonal fluctuation indicators of the local bus transport of *Nyíregyháza* – as a unique Hungarian town where passenger counts with acceptable frequency are performed - were established, moreover, proposals were made for possible rationalisation.
Key words: passenger transport, passenger count, local bus transport, seasonal fluctuations, *Nyíregyháza*.

Ref. number: 220-043-1-4
Title: Development of rationalisation methodology of scheduled inter-urban bus transport and its presentation as implemented by *Nógrád VOLÁN Ltd*.
Responsible leaders: Dr. István Zsirai; Mrs. Endréné Trepper.
Contributor: Lajos Vass
Commissioner: Nógrád Volán Rt.
Consultants of the Commissioner: Attila Antal; Lajos Bucsok.
Starting and finishing dates: 08.11.2004 – 29.03.2005.
Abstract: In our department, research has been performed for several years on the elaboration of an analysis and evaluation of scheduled inter-urban bus transportation and the development of the rationalisation procedure. The present research fielded the opportunity for a wide ranging development of the research methodology and its applicability, as well as its implementation in the inter-urban bus transport of *Nógrád VOLÁN*.
The following work items were prepared during the research and tested practically:
- Development of analysis methodology of the scheduled inter-urban bus transport with special regard to small regions;
- Development of spatial evaluation methodology of services and operational indicators of regional bus transport (setting up a methodology for small regions and modernisation of a route based analysis methodology);
- Modernisation of the rationalisation methodology of scheduled inter-urban bus transport;
- Development of computer programs of the surveys and of the methodology helping rationalisation.

The applicability of the methodology has been demonstrated with the rationalisation of the inter-urban bus transport network of *Nógrád VOLÁN*.

Key words: passenger transport, passenger count, local bus transport, inter-urban public transport, rationalisation, *Nógrád VOLÁN*.

Ref. number: 220-046-1-5
Title: EU-based elaboration of spatial and route based analysis methodologies of scheduled bus transport and its presentation in the inter-urban transport of *Szabolcs County* and local transport of *Nyíregyháza*
Responsible leaders: Dr. István Zsirai, Mrs. Endréné Trepper.
Contributor: Lajos Vass
Commissioner: Szabolcs Volán Rt.
Consultant of the Commissioner: László Ignácz
Starting and finishing dates: 16.03.2005 – 30.11.2005.
Abstract: The objective of the research was to provide answers to economic, transportation and legal questions regarding bus transport following Hungarian accession to the EU. Within this the following were elaborated:

- Overview of the EU requirements concerning scheduled bus transport, their evaluation from Hungarian aspects;
- Task-oriented evaluation of the GKM guidance and Public Service Contract;
- Elaboration of a research analysis methodology of local and inter-urban bus transport.
  - The elaborated methodologies were demonstrated while evaluating the results of the local transport in *Nyíregyháza* and the inter-urban transport of the small region of *Csenger* and the selected inter-urban bus route; moreover, proposals were made to increase the results in these areas.

Key words: passenger transport, passenger count, local bus transport, inter-urban bus transport, public service contract, *Nyíregyháza*.

Ref. number: 220-056-2-5
Title: Feasibility study with design tasks for the construction of a fluvial border crossing point at *Drávaszabolcs*
Responsible leader: László Valter
Commissioner: GKM
Consultant of the Commissioner: György Kovács
Starting and finishing dates: 10.08.2005 – 15.12.2005
Abstract: The Hungarian-Croatian Border Traffic Agreement obliges Hungary to construct a suitable river border crossing on the *Dráva*, which, following EU accession, must meet the EU requirements on border crossings. On this river there is mostly small and recreational navigation, and, subject to special permit, goods transportation may also be performed. In 2004 the requirements necessary for the EU to accept the operation of the river border crossing point were set up. In 2005, based upon the opinion of the institutions participating in the control of the border traffic, a study was made proposing steps for implementing the port, as well as a technical-construction plan for the investment, and a state survey and transformation proposal were made concerning the floating dock to serve in the port.
Key words: passenger transport, inland navigation, border crossing, floating dock, *Drávaszabolcs*.

Ref. number: 220-050-1-5
Title: Impact study concerning problems of the weekend night time bans on heavy goods vehicles traffic
Responsible leaders: Dr. János Berényi; László Valter.
Commissioner: GKM
Consultant of the Commissioner: Endre Kovács
Starting and finishing dates: 05.09.2005 – 12.15.2005.

Abstract: *Government Decree 11/1995.(IX.21.)* on bans on heavy goods vehicles traffic, and its amendment which entered into force in 2002 (*253/2002. (XII.5.)*) extensively deals with the population and the participants of the economic sphere. Various interests give rise to recurring protests, manifested every year at the transportation and environmental authorities.
In 2005, KTI analysed the interdependencies of the raised questions. Initially, we analysed the Hungarian practice of traffic bans on heavy goods vehicles based on to time, space and route validity, and analysed the relevant accident statistics.
The evaluation showed that, in comparison with the analyses of international weekend traffic ban decrees, in most of the countries surveyed similar ─ or even stricter ─ bans are in force, based on the same principles.
A proposal was made to seek solutions to the extent of the ban which meet the Hungarian and international expectations both at legal and entrepreneurial levels, taking into consideration the demands of the business federations.
Key words: heavy goods vehicles, traffic ban, traffic safety, environmental protection.

Ref. number: 220-031-4-4
Title: Comparison and analysis of Hungarian and EU rules and regulations concerning the greatest warehouse volumes by permissible fire loads
Responsible leader: Dr. János Berényi
Commissioner: BILK Logisztikai Rt.
Consultant of the Commissioner: Zoltán Mosonyi
Starting and finishing dates: 02.08.2004 – 20.06.2005.
Abstract: The layout of warehouses in the logistics service centres is significantly influenced by construction and installation investment and operational tasks resulting from fire protection prescriptions. Meeting these requirements involves significant costs for the investor and, subsequently, for the operator, which in turn means increased costs for those purchasing the goods concerned. In short, all this influences the competitiveness of the country.
As a result of the above, the fire protection prescriptions and their implementation with regard to warehouse halls – obviously taking into consideration primarily the basic aspects of the protection of life and property – should be reviewed as follows:
- How do the single prescriptions interact?
- Which rationalisations can be implemented by modernising the prescriptions?
- What economic advantage can be obtained by a reasonable modification of the prescriptions, while providing a basic level of protection?

The objective of the study was based upon a comprehensive analysis of the fire protection and construction regulations which are currently valid, and by modification of the fire protection principles and prescriptions concerning design and construction of new warehouses, to create an investment-operation condition system for the Hungarian practice with the aid of system-oriented proposals that serves as a basis for the implementation of competitive logistics services, emphasising the efficiency aspects. The study reviews the current legislation, then analyses its effects and consequences on the construction and operation of halls for logistics use. Thereafter, basic principles are established for the development of the valid decrease and regulations – including the analysis of the economic impacts of the changes. Based on this, proposals of experts could be prepared, based on the recommendations of the study, to help the decision-makers to find regulations which make it possible to utilise more rational and economic methods in the construction of warehouse halls in the future. The study makes only general proposals for a longer perspective development of the regulation, because their implementation concerns the modification of several statutory provisions (e.g. national construction regulations). However, concrete, short-term proposals are made as they do not concern laws, and the modification of ministerial decrees is simpler, and can be realised quickly.
Key words: fire load, storehouse volume, logistics service hall, fire protection prescriptions, Budapest Logistics Centre.

Transport Policy, Transport Economics

Ref. number: 271-007-1-4
Title: Research of the up-to-date transport system with balanced maintenance, operation and financing
Responsible leaders: Dr. József Pálfalvi; Mihály Békefi; István Kövesdi.
Contributors: Mrs. Sándorné Bakó; Péter Horváth; Ms. Dr. Zsuzsa Kapitány; Mrs. Lászlóné Lukács; Ms. Júlia Orosz; Attila Rajmon; Ms. Dr. Mária Magdolna Szabó; Mrs. Dr. Ervinné Szentes; Mrs. Gáborné Tóbiás; Árpád Tóth; Lajos Tóth; István Vas; Tamás Veress.
Commissioner: Kutatásfejlesztési Pályázati és Kutatáshasznosítási Iroda
Consultant of the Commissioner: Mrs. Erzsébet Kernné Nagy
Starting and finishing dates: 05.04.2004 – 15.11.2005.
Abstract: The aim of the research is the compilation of a balance that along with the revenues and expenditures, in comparison with the state budget, also quantifies which transport sub-sector is a net payer (and to what extent) and which is a net user (and to what extent).
In order to achieve the target, it was not enough to draw up the balance in a short itemised form, but many part-analyses had to be carried out in the course of our research. The target-groups of the part-analyses were the following:
• population, • carriers, • special organisations (ambulance, fireguard, etc), • organisations engaged in transport services, • other organisations (operating e.g. their own motor vehicles), • organisations involved in infrastructure development, maintenance and operation, • the state and the local authorities.
Transport revenues and expenditures of the state budget were determined on the basis of detailed analyses.
Transport revenues of the state budget:
All the revenues which are imposed in the form of taxes, duties, fees, contributions, charges due to the state budget on the transport participants and business units engaged in transport activity (with respect to their activity) or on the business units and enterprises servicing those who are performing transport activity (external revenues from the point of view of their services).
The extent of the transport tax revenues was determined according to tax groups.
In the tax groups where the subject of taxation is not the part of the transport system (e.g. company tax), the transport tax revenues are determined with the aid of the tax revenue paid by the payers of the transport taxes (see enlisted below).
In the tax groups where the subject of taxation is the part of the transport system (e.g. motor vehicle tax, company-car tax), all the tax income generated by the subject of taxation was considered as tax receipts.
Simplified, the first group was considered the transport companies', and the second, the road users' tax-group payments, respectively.
Transport expenditures of the state budget:
All direct or indirect expenditures which facilitate the road users or the (better) operation, (more efficient) administration of the business units engaged in the activity, as well as those expenses which are mitigating, eliminating the damages caused by transport (external costs).
The external costs are the most disputed items in the case of transport expenses. It is even controversial whether the road users pay for the external costs. Furthermore, the definition of the external costs is not unequivocal either.
Financing of the transport infrastructure appears to be the area that can be best tackled and quantified, but of course, even here there are many unforeseeable difficulties.

Transport balance of the state budget:
Finally, on the basis of the cash-related survey we determined the amounts paid by transport and transport oriented organisations, as well as by privates, and the sum allocated to transport from the budget and other central funds. According to the scheme outlined briefly above, the payments (for the years 2003-2004) of the transport branches and the expenditures of the state budget allocated to these transport branches were summed up (for the years 2003-2004).

Balance

(million HUF)

Denomination	2003	2004
Road transport	695 552	567 534
Rail transport	-77 098	-67 655
Air transport	-1 017	8 243
Waterway transport	4 868	4 989
Transport total*	622 305	513 111

* Pipelines not included

However, the transport balance of the state budget in itself is not sufficient for the drawing of the appropriate conclusions, although it can be considered as a good starting point. The assumption of a considerable surplus payment of the road transport sub-sector seemed to be probable, and finally, it proved to be true. This surplus payment covers other budgetary gaps, and is not used for the development of the appropriate infrastructure and the mitigation of negative external impacts. The budget provides for the railway, which is acceptable, moreover, the increase in support is desirable, considering that the railway may reduce the negative external impacts of the road, and its demands for investment. This mechanism operates really, only if the railway provides the appropriate service. Also, waterway transport needs more support, because in the field of goods transport it could relieve the road and the capacity problems the railway is faced with. Budgetary payments of air transport are unjustifiably low and very probably do not cover the noise and air pollution damage caused. Consequently, according to this presentation, on the social level the costs of air traffic are higher than its services are worth.
Key words: state budget, transport in-payments, transport expenditures, transport balance.

Ref. number: 271-008-1-4
Title: Introduction of electronic fee collection on motorways in Hungary
Responsible leader: Lajos Tóth
Commissioner: Siemens Rt.
Consultant of the Commissioner: Péter Zoltán Üveges
Starting and finishing dates: 2004 – 06.2005.
Abstract: The study deals with two main topics. On the one hand, the conditions of the implementation of a uniform fee collection system are surveyed, and on the other hand, in the light of the results, the possibilities for the application in Hungary are examined, with special emphasis on the possible trends of the development of the actual fee collection system.
It has been ascertained that present European road pricing systems are different, and this implies that technical norms should be elaborated for every vehicle and country. In the short term, the European countries cannot operate all together in a uniform, interoperable road pricing system – at least not in the near future. However, if the EU directive is expanded to the pricing of smaller capacity goods vehicles, and the use of all roads will become charged, then differentiation according to the category of heavy goods vehicles and in relation to vehicle-kilometres might be considered. Systems with roadside facilities seem more feasible. In 5-10 years, the importance of independent, on-vehicle solutions may increase. Above all, a common European strategy is

needed to resolve the interoperability problems. This was the starting point when the elements applicable to the Hungarian fee collection system were sought.
For Hungary, the introduction of a network, distance related, heavy goods vehicle fee collection system (NET) would be advantageous in which some area-dependent fee collection elements should also be used for the reduction of by-passing traffic. From the technical aspect, the introduction of the DSRC technology is practicable, at least in the short term, whereas, on the institutional level the elaboration of a mix model should be considered under combined state and private competence. The present vignette system does not contradict to future European harmonisation aims. It is necessary to maintain the camera control system, because, if fee collection in Hungary will be based on NET-DSRC procedure, the present electronic control system could successfully be developed further for monitoring purposes.
Key words: electronic tolling system, interoperability.

Ref. number: 271-012-4-5
Title: The impact analysis of EU accession in the light of cross border heavy traffic
Responsible leader: Mrs. Dr. Ervinné Szentes
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: György Bozán
Starting and finishing dates: 20.05.2005 – 15.12.2005.
Abstract: A permanent increase in road transport, loading of public roads, deteriorating accident data, increased times of transport and accessibility are problems which have to be faced not only in Hungary, but in the whole of Europe. Within the general traffic increase, the permanent increase of heavy traffic has become a matter of outstanding importance. If a longer period is considered, it can be stated that by placing the carriers' interest in the foreground, the permissible gross vehicle weight has been raised from 15 t to 44 t, while the axle load from 6 t to 11.5 t.
The 2004-2005 data of cross border heavy traffic show that inbound heavy traffic has been continuously growing; this was especially the case immediately following accession. This can be seen clearly from the specific indicator (HUF/km) generated by the excess-weight tax (road management contribution) and the amount of vehicle-kilometres, counting not only the number of vehicles, but loading as well. On the basis of the data of the one and a half years investigated, these figures were 108.6, 113.3 and 108.4 HUF/km respectively. The highest axle loading and gross vehicle weight was experienced in the second half of 2004.
The character of heavy traffic has also changed. By the first half of 2005 transit transport became dominant both in the case of vehicles with EU and non-EU registration. Heavy goods traffic is most significant in the west-east direction.
Studying a longer period (1999-2005) it could be stated, that:
- the rate of oversize/overweight vehicles has changed from 10/90 to 20/80;
- the number of all inbound heavy vehicles increased by 35-40%;
- the rate of vehicles with excessive axle load/gross weight increased from 3 to 9;
- the volume of transit traffic grow from 31% to 46%;
- the traffic of vehicles with excessive axle load and gross weight increased twofold and fourfold, respectively.

Necessary measures:
- construction of a road network appropriate for bearing heavy traffic,
- accelerating the pace of pavement strengthening;
- as part of road control, increasing the frequency of "weighing", implementation of in-depth monitoring system both at border crossings and in the practice of mobile control.
Key words: EU accession, excessive axle loading, overweight vehicles, oversize vehicles, cross border traffic, road control, pavement strengthening.

Ref. number: 271-018-1-5
Title: Competitiveness of the Hungarian road carriers and road safety after EU accession
Responsible leader: Lajos Tóth
Commissioner: GKM Közúti Közlekedési főosztály
Consultant of the Commissioner: Endre Kováts
Starting and finishing dates: 06.2005 – 12.2005.
Abstract: In the first nine months of 2005, the dynamism of the road transport of goods showed spectacular progress, especially in the field of international transport. International haulage, which was liberalised in May 2005, is present in the international freight market today with three times its former capacity, represented with a vehicle fleet up to European norms, mostly with professional experts and appropriate relationship systems. The same cannot be said in the case of domestic haulage. The average level of the vehicle fleet – notwithstanding the forced acquisitions (mostly used vehicles) of the last 1-1.5 years – cannot be evaluated with the same standards; the number of forced enterprises is significant, their commissions are mostly linked to the traditional segments of domestic haulage. Bigger and stronger enterprises of national and foreign property belong to the other branch of the inland haulage; they take hold of the higher quality and more complex logistics tasks related to production and services of West-European type. Carriers of this type of enterprises work in real competition circumstances, while the other group (working on traditional freight forwarding market) mostly makes efforts to hold its position, and often the only perspective is the maintenance of the working capacity. The fund of stocks did not follow the rate of growth of the transport capacities. A continuous reorganisation can also be experienced on the supply side. In fact, this is shrinkage, because two years ago there were 27,000-28,000 enterprises, and by June 2005 this number was below 22,000 (of this the number of individual entrepreneurs was 12,869); the vehicle fleet was reduced to 64,535 in comparison with the earlier 90,000. In the professional-political sense, steps should be taken in two directions to maintain the prestige of the transport industry or for its "legal" protection. One is the profession-corporate system oriented analysis of the possibilities connected to the demand structure change referred to in the study, and the other is the consideration, and evaluation of the factors of competitiveness.
The study shows that, as regards the cost level, the expenditures of inland operators – with the exception of fuel costs – are far lower than the costs of the carriers engaged in international transport. The real problem appears in the structure of the cost of the international transport. Carriers of the other new member countries enjoy more advantageous "budget-curtailment" conditions in the EU's inner market; therefore, in the EU, time and again, in competition with the Hungarian carriers involved in international haulage, they get into a better position than the Hungarians.
After regulation and costs, other factors are studied such as the importance of education, training, the role of business federations, and the question of official inspection. It can be stated that in order to increase competitiveness, primarily the participants of the profession must take the necessary steps. However, the role of the state, of local authorities and business organisations is at least as important in the development and enforcement of the regulatory environment, equally fair from the professional and budgetary aspects.
Key words: competitiveness, cabotage, cost level.

Ref. number: 271-019-1-5
Title: Table of international fares
Responsible leader: Lajos Tóth
Commissioner: GKM Közúti Közlekedési Főosztály
Consultant of the Commissioner: Endre Kováts
Starting and finishing dates: 06.2005 – 12.2005.
Abstract: According to *Directive 2000/30/EC* of the European Parliament and of the Council concerning the on-road technical inspection of the suitability of heavy goods vehicles to participate in the traffic on the territory of the Community, all member states must introduce on-

road technical inspection, also bearing in mind the national measures laid out in *Directive 96/96/EC* relating to such vehicles. In conformity with Article 10 of the Directive referred to, the member states agree upon the sanctions to be applied, which should be efficient, fair and should have retaining force. The member states independently enact their legislative, statutory and administrative provisions necessary for enforcement; therefore there could be differences in this field. Likewise, divergences may arise in different countries concerning the execution in practice of the inspections, though in content they meet the requirements of the directive. Since in the other fields of road inspections, in similar types of regulations the same flexibility can be experienced, in given cases the application in practice is better to be adjusted to those methods which are most frequent and accepted in the member states. In addition, the amounts of penalties applied in the EU member states, and the conditions of their introduction in the Hungarian sanctioning practice should be examined.
In the study, firstly the EU legislation in road control is presented, then the practice of implementation in the member states is overviewed in the light of the fares applied. The Hungarian inspection system and the sanctions actually in force are also surveyed. Finally, the table with international fares, compiled with the aid of the data available, is shown, and proposals are made for the revision of the present system with respect to the tendencies and the extent of the modifications.
Key words: penalty, harmonisation, sanction enforcement, on-road technical inspection.

Ref. number: 271-026-1-5
Title: Review of the community regulation of public transport services in the light of the interests of the *Hungarian State Railways* (*MÁV*)
Responsible leader: Mihály Békefi
Contributor: István Vas
Commissioner: MÁV ZRt.
Consultant of the Commissioner: László Köller
Starting and finishing dates: 10.2005 – 12.2005.
Abstract: The new system of regulation of public services in transport aimed at regulated competition with access to the international market has been in the phase of elaboration in the EU for an extended period. Although, basically, the idea of regulation can be supported, the rules include many provisions which cannot be applied in the national circumstances, or, in fact, are in contrast with our interests in maintaining the Hungarian system of public transport. *MÁV*'s interests can only be supported if this field is analysed in detail. Consequently, the conclusion can be drawn that from the point of view of *MÁV*, it is indispensable to analyse the EU regulation, to study its Hungarian effects and explore, in conformity with its interests, the possibilities of influence. Bearing all of this in mind, the aim of the research was to explore the scope of public services of *MÁV ZRt*. within the framework of the EU rules, and to yield arguments for the representation of the national interests of railway transport.
In the study, firstly a brief survey was given on the system of concepts of public services, and then the current EU regulation was presented with its expected particulars. Furthermore, the relevant Hungarian legislative system was surveyed with special emphasis on public services in railway transport. Finally, the Hungarian and the EU legislation were collated and proposals were drawn up in order to help *MÁV* develop a standpoint with regard to planned Community statutory provisions.
Key words: *MÁV*, railway transport, public transport service, loss compensation.

Ref. number: 271-027-1-4
Title: Road management duties resulting from the carriage of dangerous goods, establishment of the system of data collection and its utilisation in road management
Responsible leader: Mrs. Dr. Ervinné Szentes
Commissioner: ÁKMI Kht.

Consultant of the Commissioner: Balázs Farkas
Starting and finishing dates: 31.08.2004 – 31.03.2005.
Abstract: The study describes in detail the national and EU legislative rules relating to the road carriage of dangerous goods, emphasising the aspects which concern road management activities.
A detailed description is given of the strategy of *National Disaster Prevention*, and the special strategy concerning disaster prevention in the carriage of dangerous goods, which considers this category of transport to be a special disaster risk to civilised communities, which, in extreme cases, could become the means of acts of terrorism.
Some characteristic Hungarian data on the carriage of dangerous goods, and the relationship between mass accidents and the accident risks have been presented.
SWOT analysis of Hungarian and EU legislation was carried out, highlighting the advantages, disadvantages and inefficiencies of the present situation.
Proposals were forwarded for the performance of the road management duties resulting from the carriage of dangerous goods at a higher level. In this field, it is especially important to improve the co-operation and communication with the organisations interested in this category of goods carriage, such as *Directorate of Disaster Prevention*, *Transport Inspectorate*, ambulance, inspectorates of environmental protection, and, last but not least, with the *Central Statistical Office* – in the field of data collection and processing.
The impact analysis of the order relating to the carriage of dangerous goods bound to route permission is a task that should be solved most urgently. As a consequence, the order can be updated; the question is which ministry (Transport, Interior) should decide about the task to be answered. Maybe the withdrawal of the order would be more effective.
Improvement of provision of information for ministries (interested organisations), and participants of traffic would be important. It is suggested that for road safety reasons the carriage of dangerous goods be a part of the information of public interest which could be based on the operation of a monitoring system.
Key words: dangerous goods, road carriage of dangerous goods, route permission, information of public interest, information flow, *National Disaster Prevention Strategy*.

Ref. number: 271-028-1-4
Title: The balance between the budgetary in-payments of the participants of road transport and the budgetary expenditures of public roads
Responsible leader: Mihály Békefi
Commissioner: ÁKMI Kht
Consultant of the Commissioner: Mrs. Margit Schulz
Starting and finishing dates: 28.09.2004 – 25.04.2005.
Abstract: There is a sharp debate with changing intensity as to whether or not the road user charges cover the infrastructure use and the damage caused. The debate is intensified by an almost permanent insistence on the principles: *"Let the user pay! Let the polluter pay!"* Arguments and figures usually relate to some parts of the whole system, depending on the position of those disputing the issue. These fractional arguments concern the infrastructure itself, its use and also the damage caused by transport.
Within the framework of our research, the balance of budgetary road transport payments (revenues) and real transport expenditures or external costs (as expenses) has been prepared. This activity was connected to the project "*Research of the up-to-date transport system with balanced maintenance, operation and financing*" supported by the *Kutatásfejlesztési Pályázati és Kutatáshasznosítási Iroda*.
All state and local authority budgetary revenues (tolls, VAT, revenue tax, weight tax, personal income tax, dues, etc.) arising from transport were determined and calculated (assessed) for traffic and its related sectors (e.g. vehicle sales, vehicle repairs, road construction, etc.).
Actual transport expenditures and external costs were determined as well. Among others, the expenses of infrastructure development, maintenance and operation are "budgetary

expenditures" related to transport networks. Accidents, environmental pollution, and other harmful effects, which concern humans, nature and the constructed environment, generate external costs. On the basis of the determined, calculated or assessed data (receipts, actual expenditures, costs) it was possible to compile the balance of transport.
All these calculations aim at preventing the omission of the already delayed transport infrastructure investments, and ensuring that the damage being caused will not increase faster than the benefits resulting from the operation of the sector.
Key words: road transport, transport infrastructure, external costs, transport balance.

Traffic Safety and Traffic Engineering

Ref. number: 211-033-1-4
Title: Checking of vehicle classification by *ADR, RAKTEL, HESTIA, WEISS*, traffic counting devices on various types of day
Responsible leader: Ms. Mária Cseffalvay
Commissioner: Magyar Közút Kht.
Consultant of the Commissioner: Gábor Thurzó; Tibor Tóth.
Starting and finishing dates: 01.09.2004 – 30.11.2005.
Abstract: Vehicle classifying devices, used for traffic counts, recognise vehicle types and classify the vehicles according to various algorithms and classifying tables, specified by manufacturers. The vehicle categories, used until now by the devices, were not identical with the categories set out by the *Road Technical Prescription № 1509*. "*Országos közutak keresztmetszeti forgalmának meghatározása.*" (*Traffic counts on national roads*.) The different classification made it necessary to revise the principles governing the identification of vehicles and the most unequivocal and exact classification possible into the Hungarian vehicle categories.
Since 2001, several video surveying inspections have been performed at some automatic traffic counting and classifying points. By evaluating and comparing the videos and the synchronous instrumental measures, the frequent classification errors of the instruments, the causes of such errors and the percentages of errors of the devices were presented when establishing the detailed vehicle categories according to the *Road Technical Prescriptions*. Relying upon a detailed analysis of the data on the vehicle fleet and of the measures, a proposal was made concerning the axle distance limit values for the classification of two-axle vehicles, in order to modify the classification algorithm of the devices, classifying according to the distance of axles.
The proposed changes were implemented by the manufacturers in the classifying softwares of the *ADR* and *RAKTEL* instruments, and further tests were performed. According to the results of the comparative and suitability analyses, some corrections were made, and a proposal was submitted to introduce the measurements according to the new classification algorithm into the national traffic counts.
Until now, the test inspections were performed on weekdays in order to obtain a greater traffic sample of goods vehicles. However, it is necessary to check and quantify the errors of the devices when classifying into the mostly two-axle vehicle categories of the *Road Technical Prescriptions* (passenger car; bus; small, medium, heavy lorry) on weekends. The weekend (Sunday) and following Tuesday surveys were performed at two ADR-measuring points. Having the measurement results, a proposal was made for a further correction of the primary parameters of classification (axle distance limit values).
A large proportion of the *HESTIA* measuring points require improvement. A high-level decision was taken to establish the detailed vehicle categories according to the *ÚT 2-1.109 Road Technical Prescription* with a measuring methodological and computer technical procedure, instead of the costly reprogramming of the counting devices. We made a proposal for the new computing procedure and the modification of the data processing.
We compared the measuring exactitude of the *WEISS* devices in use at the UTFORG stations (50 sites) with the data of the national traffic counting sites operating on the same road section, and several classification errors by the devices were highlighted. Lately, no data have been recorded on the UTFORG stations, a great part of which should be renewed. Thus, correct test measurements could not be performed.
Key words: traffic count, traffic counting device, vehicle classification, *Road Technical Prescription*.

Ref. number: 211-048-1-5
Title: Establishment of the average daily traffic from short time counts
Responsible leader: Ms. Mária Cseffalvay
Commissioner: Magyar Közút Kht.
Consultants of the Commissioner: Dr. András Gulyás; Gábor Thurzó.
Starting and finishing dates: 01.06.2005 – 30.11.2005.
Abstract: A unified system of traffic counts has been working on the national road network of Hungary since 1927, of course with continuous updates.
At the secondary counting points, on approximately 85% of the national road network, the value of the yearly average daily traffic is assessed on the basis of manual counts of 2-5 day, 12 hour duration, using the sampling method, by multiplying the traffic counted during short time periods with the appropriate regularity factors.
A new methodology for improving the exactitude of yearly average daily traffic of the secondary stations, based on probability, and using correlation was presented at the TRB Conference in January 2005. The methodology allocates the secondary counting points lying on routes between common departure and destination points, to a continuously operating principle counting point. The methodology uses the generalised least squares (GLS) approach instead of the traditional least squares (OLS).
The recommended assessment procedure was tested using data from 2004 and 2001 (in some cases 2002 or 2003) of 34 Hungarian traffic counting points, as well as an average daily traffic assessment methodology using proportions, and analysed the possibility and domain of the domestic implementation.
Key words: traffic counting, secondary counting station, average daily traffic.

Ref. number: 211-015-1-4
Title: SUNflower+6
Responsible leader: Dr. habil. Péter Holló
Contributor: János Gyarmati
Commissioner: SWOV - Institute for Road Safety Research, The Netherlands
Consultant of the Commissioner: Fred Wegman, director
Starting and finishing dates: 01.01.2004 – 31.12.2005
Abstract: As is well known internationally by professionals, it was the evaluative comparison of the road safety policy of three European countries with the best road safety, the so-called *"SUN countries"* (**S**weden, the **U**nited Kingdom, the **N**etherlands), that led to this project. The methodology applied was further extended to 6 other countries. Of these countries, the Czech Republic, Slovenia and Hungary form one group, from the CEE countries.
The project until now included on the one hand, the systematic collection, analysis and comparison of the accident and background data of recent years, and on the other hand, within the framework of case studies, the beginning of the investigation of areas which are of outstanding importance from the aspect of road safety.
Of the 11 case studies, KTI was responsible for the themes: "speed" and "cyclists". With our collaboration the Dutch project leader developed a methodology for comparing the road safety situation of the different countries.
As a result of the evaluative comparison, the final volume of the project drafted proposals for real measures for the decision makers in each country.
Key words: road traffic safety, international comparison, *SUNflower+6* project.

Ref. number: 211-017-1-4
Title: SafetyNet
Responsible leader: Dr. habil. Péter Holló
Contributors: Ms. Éva Csapó; Miklós Gábor; Dr. Domonkos Jankó; Dr. Gábor Merényi; Tibor Mocsári; Tamás Siska; Dr. Tamás Véssey.
Commissioner: Loughborough University, United Kingdom
Consultant of the Commissioner: Prof. Pete Thomas

Starting and finishing dates: 2004.05.01 – 2008.05.31.
Abstract: The aim of the project is to set up an EU road safety observatory and supply it with data. KTI participates in the implementation of the following tasks: collection of the exposure data (population, vehicle fleet, vehicle-kilometres, road length, etc.) and their integration into the EU's "*CARE*" database, together with Hungary's road accident data; development of the system of road safety performance indicators, elaboration of data registration methodology, the so-called "best practice" directive for all member states. The responsible leader is directing the part-theme addressed to DRL: **d**aytime **r**unning **l**ights. Until now the state-of-the-art report of the actual situation, as well as the study with the summary of the requirements for data collection, have been prepared. Currently, the evaluation of the data received until now and the possibilities for further data collection are ongoing.
Key words: road traffic safety, road safety performance indicators, risk exposure, DRL – daytime running light, *CARE* data base, *SafetyNet* project.

Ref. number: 211-039-1-5
Title: Analysis of accident statistics, data supply, registration of personal injury accidents, a comprehensive collation of the revised material of the *National Road Safety Programme*.
Responsible leader: Dr. habil. Péter Holló
Contributors: Dr. Domonkos Jankó; Mrs. Jánosné Papp; Tamás Siska; János Gyarmati.
Commissioner: GKM Közúti Közlekedési Főosztály
Consultant of the Commissioner: Miklós Szilágyi, Dr. Péter Lányi.
Starting and finishing dates: 01.03.2005 - 10.12.2005.
Abstract: We discussed with professionals the new version of the *National Road Safety Programme* dealing with human factors. Taking into consideration the remarks and proposals, the Programme's previous version has been revised; moreover, the chapter on infrastructure and the proposal on drafting the renewed programme have also been prepared. If approved by consultants, the material will be sent out for comprehensive collation. In the course of the work – in addition to other arguments – the chapter on human factors received priority, because we are convinced, that this is the field where the most must and can be done for the actual road safety situation in Hungary.
Key words: road accident data, accident data analysis, accident registration, human factor, *National Road Safety Programme*.

Ref. number: 211-040-2-5
Title: Compilation of information in English with regard to road safety legislation in Hungary, in order to answer the inquiries of EU member states
Responsible leader: Dr. habil. Péter Holló
Commissioner: GKM Közúti Közlekedési Főosztály
Consultant of the Commissioner: Miklós Szilágyi
Starting and finishing dates: 01.03.2005 – 28.11.2005.
Abstract: Within the framework of the project, the payment of the KTI's membership dues to different international organisations (*ICTCT, FERSI,* and *IRTAD*) has been ensured. In the course of the year we continuously participated in the work of leading professional organisations (*PIARC, ETSC, ECMT, FERSI, OECD-IRTAD,* and *EU*). This meant the elaboration of professional views; their eventual preliminary collations; filling in of questionnaires; acquisition, control and sending of the data requested; participation in debates; presentation of lectures and contributions meaning a high level professional background activity. Our highly important *IRTAD* (***I****nternational* ***R****oad* ***T****raffic and* ***A****ccident* ***D****atabase*) membership, among other benefits, ensures on-line access to the updated findings of every OECD country. The professional and comprehensive international comparisons produced this way are indispensable for the high level expert background activity.
Key words: road traffic safety, legislation, international organisations, international co-operation, *ICTCT*, *IRTAD*, *FERSI*.

Ref. number: 213-015-2-4
Title: Determination of the accident danger scale of the railway crossings in 2003 (together with the 2004 grading)
Responsible leader: Tibor Mocsári
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Zoltán Nagy
Starting and finishing dates: 11.04 – 03.05.
Abstract: Due to the renewal of the system of reviews, the scale of 2003 was prepared according to both the old and the new methods. Among the first 30 crossings there are only two on the list which have been updated. Consequently, in this grading list those crossings come first (mainly equipped with barriers with light signal only) at which the sites for intervention have to be singled out. The following statement can be declared if the number of personal injury accidents occurring at railway crossings and on the whole national road network is analysed: as of 2003 the two trends diverge. Further increase may be observed on roads, while the number of personal injury accidents at railway crossings decreased. If railway accidents not occurring due to gate installation are added to the figures of the railway personal injury accidents, the accident number would increase at the same rate as road accidents. Consequently, the favourable accident situation in railway crossings is due primarily to the gate installation programme.
Key words: danger exposure, railway crossing, danger scale of crossings.

Ref. number: 211-018-1-4
Title: Application of the road safety infrastructure – basic research and development in the interest of road safety in Europe; for sustainable surface transport with the increase of the safety and reliability of the secondary road network (*RIPCORD-ISEREST*)
Responsible leaders: Tibor Mocsári; Dr. habil. Péter Holló.
Commissioner: BASt
Consultant of the Commissioner: Roland Weber
Starting and finishing dates: 01.05 – 12.07.
Abstract: KTI, together with leading institutes of 14 countries, has been participating since 2004 in the framework project *RIPCORD/ISEREST* EU 6 addressed to the harmonisation of the *Road Safety Infrastructure Management* (road safety impact analysis, road safety audit, safe road network management, and road safety revision) among European countries.
Work started with a survey of the practices of the European countries in 2005. According to the findings, this method, or some part of it, is used in almost every European country. Using this experience the best solutions should be selected and a uniform system developed in the future work.
Key words: road traffic safety, road safety audit , road safety inspection, accident black spot, harmonisation, *RIPCORD/ISEREST* project.

Ref. number: 213-030-1-5
Title: Elaboration from road safety aspects of the speed data of 2004 recorded by Hungarian traffic counting devices.
Responsible leader: Tibor Mocsári
Commissioner: ÁKMI Kht.
Consultant of the Commissioner: Károly Rankli
Starting and finishing dates: 06.05 – 11.05.
Abstract: The study comprises the analysis of the 2004 data recorded at 40 *ADR 2000* automatic traffic counting sites with the application of the SPSS statistical programme package using the ANOVA (*Analysis of Variance*) procedure. During the analysis of the speed data measured in 29 traffic lanes of 15 measuring sites outside built-up areas, a decrease in speed was experienced in 2 cases, while the figures recorded in 22 lanes showed significant increases.

No considerable difference could be shown in the study of 58 lanes of 25 measuring sites outside built-up areas: data of 13 lanes pointed at a significant speed decrease, whereas those of 37 lanes showed speed increases. As a reference, those data were used which had been recorded prior to the amendment of the *KRESZ* (*Hungarian Highway Code*) in 2001. It has been stated that in comparison with the period prior to the introduction (before 1 May 2001), after the amendment of the *KRESZ* (2004), the free speed of vehicles outside and in built-up areas increased on average by 2,06 km/h and 0,74 km/h, respectively (a total average increase of 1,18 km/h). It is especially noticeable that – although the amendment of the *KRESZ* did not change the speed limit valid for built-up areas – a permanent and continuous increase can be experienced here also.
Key words: speed, speed measuring, traffic volume, following distance, statistical analysis.

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Dr. Péter LÁNYI, president

Dr. Péter MENICH

Dr. István PRILESZKY

László SÁRADY

János TOBLER

András TÓTH

Dr. Tamás TURAI

Board of Directors

Dr. László RUPPERT, managing director

Dr. József PÁLFALVI, scientific director

Dr. Mrs. Béláné TERMAN, finance director

List of employees

(31 December 2005.)

Albert, Gábor
Antonik, Pálné Mrs.
Bagoly, Zoltánné Mrs.
Bakó, Sándor
Bakó, Sándorné Mrs.
Bársony, Istvánné Mrs.
Békefi, Mihály
Benedek, Gábor
Berényi, János Dr.
Berszán, Miklós
Berta, Tamás
Beszedics, Istvánné Mrs.
Bite, Pálné Dr. Mrs.
Bognár, Gábor
Bors, Tibor
Bőröndi, Lajosné Mrs.
Bundik, Mihályné Mrs.
Buna, János
Büki, Imre Dr.
Cseffalvay, Mária Ms.
Csókáné, Forgách Veronika Mrs.
Csonkáné, Vincze Ildikó Mrs.
Csúcs, András
Czár, Lászlóné Mrs.
Czeglédi, László
Dabi, József
Dajkáné, Tényi Ágnes Mrs.
Dobos, Imre
Erdélyi, Csaba
Farkas, Tiborné Mrs.
Fáró, Attila
Flamisch Ottó Dr.
Flórián, Gyuláné Mrs.
Földesi, Sándorné Mrs.
Frank, András
Frigyesi, Anikó Ms.
Frigyesi, Józsefné Mrs.
Füredi Mihály Dr.
Füzesi, Győzőné Mrs.
Gábor, Miklós
Gál, Tibor Dr.
Garda, Zsolt Béla
Gáspár László Dr. habil.
Gerencsér, Károly
Gyarmati, István
Gyarmati, János
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Hajdú, Sándor
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Holló, Péter Dr. habil.
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Jaksa, János
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Junacsek, István
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Kardos, Mihály
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Lizák, István
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Nyíriné, Suri Éva Mrs.
Oláh, Zoltán
Olsavszky, Emil
Orosz, Júlia Ms.
Paár, István Dr.
Pál, Ernő Dr.
Pető, István
Piros, Bertalan
Pollák, Iván
Puskás, Annamária Ms.
Raffer, Gyuláné Mrs.
Rajmon, Attila
Reményi, Istvánné Mrs.
Rimaszombati Jenőné Dr. Mrs.
Ruszkai, Pál
Sallai, Györgyné Mrs.
Semsei, Miklósné Mrs.
Sikolya, Istvánné Dr. Mrs.
Simon, Erika Ms.
Skokán, Gábor
Spánik, Ágoston
Strasser, Elemér
Strasser, Sándorné Mrs.
Suri, József
Szabó, Andrásné Mrs.
Szabó, István
Szabó, Mária Magdolna Dr. Ms.
Szabó, Sándor
Szájer, Ferencné Mrs.
Szarka, Péterné Mrs.
Szathmáry Miklós Dr.
Szele, András
Szentes Ervinné Dr. Mrs.
Szilágyi, Miklósné Mrs.
Szlobodnyik, Lajos
Szőke, József
Takács, Kálmán
Tamási, Attila
Tari, János
Till, Ferencné Mrs.
Tóbiás, Gáborné Mrs.
Tóth, Árpád
Tóth, Attila
Tóth, Károly
Tóth, Lajos
Tóth, Zoltán
Török, Gáborné Mrs.
Trepper, Endréné Mrs.
Uhrinyi, Zoltánné Mrs.
Valter, László
Váradi, András
Varga, Katalin Ms.
Varga, Ludmilla Ms.
Varga, Mihályné Mrs.
Varga, Viktória Ms.
Vas, István
Vásárhelyi Boldizsár Dr.
Vass, Lajos
Vázsonyi, Lászlóné Mrs.
Veréb, László
Veress, Tamás
Wild, Istvánné Mrs.
Zámbó, András
Zsirai, István Dr.

Some Hungarian Acronyms

ÁKMI Kht. / ÁKMI	Állami Közúti Műszaki Információs Közhasznú Társaság Technical and Information Services on National Roads
BM	Belügyminisztérium Ministry of the Interior
GKM	Gazdasági és Közlekedési Minisztérium Ministry of Economy and Transport
KTE	Közlekedéstudományi Egyesület Hungarian Society for Transport Sciences
KTI Kht. / KTI	Közlekedéstudományi Intézet Közhasznú Társaság Institute for Transport Sciences Non-profit Company
KvVM	Környezetvédelmi és Vízügyi Minisztérium Ministry of Environment and Water
NA Rt.	Nemzeti Autópálya Rt. National Motorway Ltd.
MOL Rt. / MOL	MOL Magyar Olaj- és Gázipari Részvénytársaság MOL Hungarian Oil and Gas Public Limited Company
ÖMISZ	Önkormányzati Útügyi Műszaki Információs Szolgáltatás Technical and Information Services on Local Roads
UKIG	Útgazdálkodási és Koordinációs Igazgatóság Road Management and Co-ordination Directorate