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RESEARCH ACTIVITIES IN THE FIELD OF RAILWAY TRANSPORT

Transmitted by the Governments of Belarus, Czech Republic, Denmark, Germany, Hungary,
Latvia, Lithuania, Netherlands, Slovakia, Slovenia, Sweden, United Kingdom

At its fifty-fourth session (3-5 October 2000), the Working Party asked Governments to provide information on research activities in the field of railway transport (TRANS/SC.2/194, para.53).

The information provided by Governments and international organizations is reproduced below for consideration by the Working Party.

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BELARUS

Studies of traffic on Belarusian Railways are carried out in accordance with research and development projects approved by the Rail Transport Council of the CIS countries, and also on a bilateral basis through the conclusion of agreements with higher academic institutions, institutes of the Belarusian National Academy, and the research and development bureau of the Ministry of Railways of the Russian Federation.

CZECH REPUBLIC

In 2000, research and development activities of Czech Railways on the international basis have been aimed to several directions. There is a long-term participation in the international R&D project under the auspices of the UIC (International Railway Union) and ERRI (European Railway Research Institute). Czech Railways have been involved to various degrees into more than one hundred of R&D projects organised by the above institutions. It stands to reason that Czech Railways activities are permanently directed to applications of its own standpoints and needs within the framework of medium- and long-term intentions of the international railway entity, to collection of immediate information and experience necessary for the provision of solutions to the harmonisation and interoperability issues of technical, information and management means of railways on the international scale.

Above these activities and in contrast to past, Czech Railways intensified their involvement in the EC Framework Programmes, especially within the Fifth Framework Programme for EC R&D Programme Support (hereinafter referred to as the '5th FP'). Czech Railways thus took the advantage of invitation of companies from EC associated-member countries to take part in research consortia (i.e. joint working teams involving usually research institutes, basic research institutions, manufacturers and potential end-users) and started their involvement in several activities.

- Functional tests of the APOLO Project results have been completed (these activities have already been organised under the 4th Framework Programme);
- Czech Railways performed their tasks within the ProMain Project consortium without any rests and they were therefore invited to enhance their participation;
- Within the thematic programme 'GROWTH', Czech Railways moved into the activities of four different consortia suggesting potential projects within the third call in this Programme. This evaluation has been already completed and the European Commission accepted two of those proposals to be financed under the EC participation. (Please, note that success rate here is about 25%).
- Czech Railways also joined two consortia within the framework of the IST Programme. Even though their proposals here received good ratings, they have not met the criteria for financing the projects. It was, nevertheless, recommended to remove minor drawbacks and to participate in the calls for 2001.

Research and development activities of Czech Railways conducted on the national level in 2000 were focused to solution finding for current issues connected, in their major part, with speed level increasing in the corridor lines, issues connected with the accession and incorporation into the EC structures and legislation and also solutions to problems arising under current operations.

Out of important projects followed in 2000, it can be noted in particular:

- Proposal of criteria of putting vehicles with flat and out-of-round wheels out of service on the basis of ASDEK device indications. The project goal was to determine, on the basis of driving tests with vehicles having exactly defined wheel defects, unambiguous criteria of removal of defective cars out of service under results measured by the ASDEK device (and removing this activity from the authority of rolling-stock foremen who are not suitably equipped for impartial assessments).
- Evaluation of railway superstructure and substructure influences to propagation of noise and vibration in modernised sections of railway corridor lines. The measurement results have been compared with the results received before the line reconstruction and they demonstrate the contribution of high-quality lines to noise/vibration attenuation and better/cost saving design of noise barriers.
- The modification of customer conditions for electricity supplies at Czech Railways. The subject of this project concerned analyses of driving vehicle demands in separate power supply stations and proposal of selection of the most advantageous tariff conditions, incl. potential control of demand in the connection with the changes in the tariff items of the current utility supplier.
- A study of a complex solution of transport serviceability in the Ostrava Region involves an analysis of the current conditions and integrated transport system design.
- Commencement of the project of 'Research of dynamic properties of rail vehicles at higher speed levels and considerable superelevation insufficiency as a part of measures to secure safe driving at high speed.
- Commencement of the project of 'Application of European ERTM/ETCS interlocking system within the network of Czech Railway. The project is structured into two basic parts: full employment at primary lines and safe operations at secondary lines.
- In the end of 2000, the recommendation on the new European standard of GSM-R track radio communication has been introduced into the service in Czech Railways. Preparations of pilot project implementation at the line Di èín – Prague – Kolín, representing the IVth European Corridor in the Czech Republic and being connected to DB, A and G lines, are under way at present.

DENMARK

During the autumn of 2000 political agreement was reached on implementing a supplementary investment plan in the area of railway safety amounting to about 100 mill. DKK over the period covering 2001-2004 including investment in automatic train control systems, safety at level crossings and safety of railway employees etc.

The plan was preceded by a systematic analysis by Banestyrelsen (the Danish National Railway Agency) into the costs and effects of various possible measures to increasing the safety in railway transport.

GERMANY

In conjunction with federal transport infrastructure planning activities and the requirement plan for the railways, the following studies are being carried out at the Federal Ministry of Transport, Building and Housing:

- Review of the measures contained in the requirement plan for the railways: in-depth study of local and regional rail passenger transport;
- Review of the measures contained in the requirement plan for the railways: passenger traffic forecast and development of the set of quantities to be used for evaluation;
- Update of the freight traffic forecast to review the measures in the requirement plan for the railways;
- Elaboration of the reference case and calculation of scenarios to review the measures in the requirement plan for the railways;
- Review of the requirement plan for the railways: long-distance passenger traffic forecast and development of the set of quantities to be used for evaluating various improvements to infrastructure and services;
- Information system for rolling stock on bus or telematics basis;
- Development and appraisal of network concepts for combined transport from the perspective of the required rail tractive power, taking into account the possibilities of integrating middle-order and higher-order centres into the network;
- Review of the Railway Construction and Operating Regulations to determine what scope exists for innovative approaches to attract traffic back to the railways and ensure that it stays there;

In the sphere of the Urban Transport research programme, the following studies are planned for 2001:

- Examples of good practice in integrating services on secondary local passenger transport lines into regional public transport services in Germany and the EU, with particular focus on economic efficiency;
- Methods for appraising current and future potential, *inter alia* taking into account various upgrading and operating standards;
- Possibilities and limits of providing low-cost local and regional services on secondary railway lines;
- Low-cost improvement measures in current local and regional passenger rail services, using selected typical examples;
- Comparative review of the planning, organization, legal, financial, operational and entrepreneurial aspects of integrating local and regional passenger rail services into the local public transport systems of the 16 federal states;
- Various models for cooperative ventures between the authorities responsible for local public transport and local public transport operators, including the organizational and financial implications;
- Guide to tendering for local and regional passenger rail services.

HUNGARY

The national railway company comprises an institute for experiments and developments, with US\$ 0.6 million budget per year (1 % of total cost of the company) for 60 research themes in average, to support directly the railway operation, to increase the service level, the safety and to protect environment.

Further on, the institute undertakes to detect the state of the infrastructure with special measuring vehicles, also abroad.

LATVIA

LDz expenses in the research activities (th.EURO):

1995	16
1996	406
1997	363
1998	668
1999	340
2000	167

LITHUANIA

The JSCSP “Lithuanian Railways” and the Vilnius Gediminas Technical University concluded an agreement on the scientific research activities in the field of railway transport provided by the university preparing and training of staff for Lithuanian railways.

NETHERLANDS

The Dutch Government is carrying out a study on the alternatives in reference to the “IJzeren Rijn” which connects the port of Antwerp with the German Ruhrgebiet. Two feasibility studies are being carried out. One regarding the high speed freight transport and the other one regarding rail distribution in urban areas.

SLOVAKIA

Research activities in the area of railway transport within the ŽSR are concentrated in the Research and Development Institute of Railways in Žilina. The research agenda is primarily focused in the following areas:

- extension of the life cycle of rail cars through introduction of new repair technologies;

- operation and maintenance of construction and structural elements of the railway subbase;
- increase in security of railway transport;
- the issue of speed increase;
- determination of technical and quality conditions of constructions of railways;
- drawing up of internal and railway standards and regulations;
- social, economic and legal considerations of railway transport at the national level as well as in the context of approximation to the European economic and political associations.

SLOVENIA

There are no direct research activities carried out by the Government in the field of railway transport. All research activities are carried out by the Slovenian Railways with its co-financing of the research activities at UIC and at the Transport Institute - daughter company of the Slovenian Railways.

SWEDEN

Example of research in progress in the railway field¹:

- Vibrations by railway traffic. As axle-load and speed increases, the question on how to handle vibrations by railway traffic becomes more important.
- Influence on railway-bridges by higher axle-loads. The study is initiated by goods customer's demands for higher permitted axle-loads. The study examines if permitted axle-loads can be increased without strengthening existing railway-bridges.
- Railway possibilities on the future goods market. The study evaluates the possibility for railway enterprises to grow in different sub-markets.
- The changed regulation and the deregulation of the Swedish railways system. The study is examining effects of the changed regulation and the deregulation in terms of its origin, motive, effects and possible future development.
- Possibilities for Tram-Train traffic in Sweden. The study has evaluated the technical possibilities for Tram-Train traffic in Sweden and in addition possible community-benefits of a future Tram-Train system in Stockholm.
- The national road administration and national rail administration has among others jointly financed a project aiming to create a interactive information system on service levels for older, disabled, families with children and other travellers with special needs.

Source: National Rail Administration

¹ In addition to the information contained in this document a list of research projects in the field of railway transport in Sweden will be made available as an informal paper to the participants of the fifty-fifth session of the Working Party.

Examples of research in progress in the railway field funded by VINNOVA:

Establishment of new railway links - influence on the travel market and urban development. A study of the Stockholm - Eskilstuna link

Mode choice and travel demand between Stockholm and Arlanda

Effects on Society as a Whole by Means of Competition Promotion within Road and Railway Operations and Maintenance - R13

Efficient train systems: market, operations, train concepts, valuations and economy

Expert Centre: Traffic environment for the elderly and disabled

Loss of scale advantages from competition in railway system

Theme Management - Optimizing methods for the allocation in operation and maintenance activities - Doctoral project CDU: R2

Housholds and urban structures in sustainable cities

Human-Machine Interaction and Operator Interfaces for Rail Traffic Management and Control

Insulation of blocks of flats against groundborne noise from trains

Understanding siting controversy: the case of Väst kustbanan

Noise from trains and cars

Research theme: Organisation and Incentives, part 2

The Botnia line

Integration of transport modelling, spatial statistics and geographical information systems

Research programme on the regional development impacts of the Öresund bridge - project plan for 2000-2003 and beyond

The Development of Regional Logistics Centers

Market-Adjusted produktin and organisation of International Rail Transport between Sweden - Central Europe and Spain

Innovative Railway Technology

Public Transportation from a Serice Management Perspective - market and Service Orientation in Public Transportation

Efficient train systems for rail-freight transportation - an introductory study

New Nordic prediction method for rail noise - Source modelling, emission measurements and final verification of method

Mathematical models for complex problems in transport applications; extended cooperation between VTI and the University of Linköping

Transport analysis and forecasting systems

Transport future studies

Competition Conditions in the Freight Transport Sector

Management of public transport services - A research programme management of contracts, marketing and competence

The development of an efficient and user friendly methodology for planning and assessment of local and regional public transport.

UNITED KINGDOM

The United Kingdom Government's research activities in the field of railway transport aim to support the achievement of the Government's integrated transport objectives and policies, the 10 Year Plan and the Public Service Agreement (PSA) targets. In devising its railway research activities, the United Kingdom Government (i.e. DETR) takes account of research by other organizations to ensure that the Government's research complements external railway research by the railway industry, public bodies such as SRA, HSE, ORR, and others, and avoids any unnecessary duplication.

In March 2001 the United Kingdom Government published a consultation document entitled "A Strategy for DETR Integrated Transport Research." This identified the following major themes for railway research:

- (a) Reducing the impact of transport on the environment
- (b) Improving rail safety
- (c) Improving and modernising rail transport
- (d) Modelling and forecasting demand for rail transport

The rail industry and the SRA the lead for research into items (a), (b) and (c). The HSE also has a strong interest in item (b). The Government's research activity is at present focused on item (d).

The United Kingdom Government's experience of devising the 10 Year Plan highlighted the need for further improvements in the Government's modelling and analysis capabilities to inform the future development of integrated transport objectives and policies. The United Kingdom Government is, therefore, undertaking research to improve and extend rail modelling within the context of multi-modal forecasting. The research aims to improve the United Kingdom Government's ability to appraise rail and wider transport policy and expenditure options and their impacts on a wide range of objectives, in order to improve the "evidence base" for decisions. Thus, the research will allow the United Kingdom Government to assess the impact of quality and service improvements on rail demand, the extent of modal transfer, and the likely impact on PSA targets, including road congestion, rail overcrowding and the environment.
