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EU RAIL SAFETY POLICY AND RESEARCH

Overview

Over the years, rail transport in Europe has had a good safety record compared to other modes of transport and with regard to improvements achieved over time.

However, key changes are now taking place throughout Europe in the organisation of railways which could lead to an increase in rail accident risk. At the same time, recent rail tragedies in different European countries have led European Commission Vice President de Palacio to insist that the EU rail safety record should be the best in the world.

Later this year, the EC is expected to bring forwards a Railway Safety Directive, which will cover a variety of matters, including the promotion of harmonised and transparent risk-based safety acceptance criteria, common methods of risk assessment, and independent accident investigation.

The establishment of a European Rail Agency for interoperability and safety is also foreseen. This agency is intended to give the necessary support to strengthen the interoperability process and to develop common safety targets, common safety methods and to ensure that documents and databases publicly available.

This edition of ETSC Update summarises Commission plans to improve rail safety and also reports on recent findings from Community research programmes.

Recent legislative actions

The two key Directives are the Interoperability Directives 96/48/EC for High-Speed lines and 2001/16/EC for conventional lines. Both Directives are supported by Technical Standards for Interoperability (TSIs); the TSIs for High Speed lines are almost complete, and those for conventional lines are now being developed. Although these are not primarily concerned with safety, the harmonisation process has to ensure a high level of protection to meet Treaty obligations and this will inevitably increase the involvement of the EU with railway safety matters.

In March 2001 the so-called Railway Package was published in the Official Journal (O J L 075), which defines the Trans European Rail Freight Network (TERFN). It allows European rail transport companies access to this network in order to operate international freight services in the Community, subject to the conditions stipulated in the Directives. The aim of the package is to create a genuine single market for rail freight transport similar to that which already exists for road vehicles.

The EU Railway Package

- Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001 amends Council Directive 91/440/EEC on the development of the Community's railways.

- Directive 2001/13/EC of the European Parliament and of the Council of 26 February 2001

amends Council Directive 95/18/EC on the licensing of railway undertakings.

- Directive 2001/14/EC of the European Parliament and of the Council of 26 February 2001 on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification.

Directive 2001/12/EC opens up the possibility for all licensed railway undertakings meeting specified conditions to have access rights for international freight activity for a transitional period of up to 7 years, on a defined network, called the TERFN, including access to and supply of, services in major terminals and ports.

After this transitional period, the TERFN would cover the entire European rail network and railway undertakings would be granted rights of access for international freight transport.

Directive 2001/13 extends the provisions of 95/18/EC which introduced a licence for railway undertakings providing international transport services and the combined international transport of goods. Licences granted by a Member State where the rail transport company is established, would be valid for the whole of the Community.

Directive 2001/14 states that all railway lines in the TEN should be open to international freight operations by 2008. Whether this will mean that locomotives and crews will still change at the borders or that (thanks to interoperability of conventional trains) a number of truly cross-border services will operate remains to be seen. In any case there will be major changes for the organisation of rail safety activity.

The Directives deal with safety aspects in various ways; a few principal objectives and aspects are worthy of note;

The principal objective (as with the Interoperability Directive 2001/16/EC) is to reduce the railway barriers between the EU Member States and to improve international train operations. This will mean in time a certain degree of uniformity regarding licensing of operators, safety certification, train path allocation and access charging. Clearer and more transparent division of responsibilities between infrastructure managers, operators, railway inspectorates, regulators and appeal bodies will also ensue. Safety standards and rules will be laid down, rolling stock and railway undertakings certified accordingly.

Interoperability of European railways

The European Parliament and the Council adopted on 19 March the Directive 2001/16/EC (O.J L110, 20.4.2001) on the interoperability of the trans-European conventional rail system.

This Directive sets out the conditions that must be met by the trans-European conventional rail system, the subsystems and the interoperability constituents in order to achieve technical harmonisation. The Member States cannot prohibit, restrict or hinder the placing on their market of a constituent unless it fails to comply with the Directive's requirements.

As regards the period prior to the publication of a Technical Specifications for Interoperability (TSI) or in the absence of any specification, the Member States must notify other Member States and the Commission of a list of the standards and technical specifications in use. Member States must comply with this Directive no later than 20 April 2003.

ERTMS characteristics

In March the Commission adopted the Decision on the technical characteristics for the trans-European high-speed rail system covering command-control and signalling subsystem (O.J. L95, 3.4.2001).

This system aims to bring a significant improvement in safety and will

harmonise railway signalling and telecommunications systems.

According to Transport Commissioner Loyola de Palacio, this decision represents an essential investment: facilitating total interoperability which will avoid excessive production costs and make it easier to open up new, high-speed trans-European rail links over the next decade.

Railway statistics

In February the European Commission submitted a proposal for a Regulation on statistical reporting by rail transport (COM(2000) 798) to replace the existing Directive of 1980. The provision of harmonised safety data is one of the main changes. as is the extension of rail statistics In Annex H of the proposal the accident data to be collected are set out.

List of variables, units of measurement	- number of accidents (Tables H1, H2) -number of persons killed(TableH3) - number of persons seriously injured (Table H4)
Reference period	Year
Frequency	every year
List of tables with the breakdown for each table	Table H1: number of accidents, by type of accident Table H2: number of accidents involving the transport of dangerous goods Table H3: number of persons killed, by type of accident and by category of person Table H4: number of persons seriously injured, by type of accident and by category of person
Deadline for transmission of data	5 months after end of reference period
First reference period	2002
Note	1. Type of accident is broken down as follows: - collisions (excluding level-crossing accidents) - derailments - accidents involving level-crossings - accidents to persons caused by rolling stock in motion -others -total 2. Table H2 has the following breakdown: - total number of accidents involving at least one railway vehicle transporting dangerous goods, as defined by the list of goods covered by Annex K - number of such accidents in which dangerous goods are released 3. Category of person is broken down as follows: - passengers

	- employees (including contractors) -others -total 4. The data in Tables H1-H4 shall be provided for all railways covered by this Regulation. 5. During the first five years of application of this Regulation, Member States may report these statistics according to national definitions, if data conforming to harmonised definitions (adopted according to the procedure of Article 11 paragraph 2) are not available

It is hoped that the lack of comparable statistical information will be remedied by the new rules.

ETSC has outlined regularly the need for this policy support, specifically in its Briefing on Priority Issues in Rail Safety of 1999 and most recently in a Review on Transport Accident, Incident and Casualty Databases. Consequently ETSC welcomes this initiative although the lead-time of five years for compliance with the Regulation seems unnecessarily long.

Railway Safety Directive

The Commission is expected to bring forward a new Railway Safety Directive, by the end of 2001, which is expected to cover a variety of matters, including the promotion of harmonised and transparent risk-based safety acceptance criteria, common methods of risk assessment, and independent accident investigation.

RESEARCH PROGRAMMES

The primary purpose of EC intervention to date has not been safety, but to improve the competitiveness of railways relative to other modes, specifically by improving the ease with which passenger and freight trains can cross national borders, and by creating a single market for railway equipment.

However, there is also a desire to improve safety as part of the intervention and to meet Treaty obligations and this has been reflected in recent research programmes.

News on recent Community research projects

SAFETY REGULATIONS AND STANDARDS FOR EUROPEAN RAILWAYS (NERA STUDY)

In the autumn of 1998, the Commission let a research contract to the consultants NERA, in collaboration with other organisations throughout Europe, to study railway safety regulations and standards. The principal objectives included:

(a) providing an overview of the existing safety regulations among Member States;

(b) assessing the impact of existing differences in safety regulations and practices among Member States on seamless railway operation and on the provision of equipment;

(c) developing recommendations for a common safety approach to rail safety within the EU.

The final report of the study was completed in February 2000, and is published. The report can also be found on the world wide web at: http://www.nera.com/news/acrobat/V1.pdf

The recommendations are wide ranging. Some of them are expected to be taken forward by the Commission's proposed Safety Directive later this year. A general theme is a recommendation towards greater transparency in railway safety decision making, away from the internal procedures that are traditional on nationalised railways. This includes a progressive move towards 'due process', in which all parties are heard and reasons given for decisions, better safety information (a cause also espoused by ETSC), more use of cost benefit analysis, and more explicit safety decision rules.

A second theme stems from the observation that the move towards greater interoperability inevitably means that the locus of key railway decisions is shifting from the national level to the European level. The national organisations - infrastructure managers, train operators, manufacturers, regulators - will continue to provided the principal professional input, but the European level needs to be strengthened to coordinate all this international effort. Hence the report recommends, among other things, a new railway agency as an EU institution to provide an executive interface between DG TREN and the industry.

CASCADE and ACRUDA

The CASCADE and ACRUDA projects dealt with safety assessment and certification of software driven electronic systems. CASCADE focussed on functional safety and software aspects whereas ACRUDA examined digital architectures, especially distributed hardware.

CASCADE: Certification and assessment of safety-critical development applications.

Aim: to unify the process of assessment of safety critical systems in the EU towards a mutual recognition of competence. Three safety principles GAMAB (France), ALARP (UK) and MEM (Germany) were brought together as General Assessment Methods (GAM).

ACRUDA*: Assessment and certification rules for digital architecture

Aim: The definition of the assessment framework and criteria for safety architectures used in the guided public transport industry and the development of a certification scheme for safety architectures. The project was finalised in 1998 and the results were fed into the EEIG ERTMS Users Group and to CENELEC standards.

Results: ACRUDA has produced:
- recommendations on the content of a Quality Handbook that describes a quality system for assessment of safety-critical digital structures in the field of railway signalling
- a common set of assessment criteria to evaluate the processes and products of the digital architecture with regard to product life cycles - the ACRUDA assessment procedures and criteria for vital computers
- Close interaction with the ERTMS (European Rail Traffic Management System) project strengthened technical links for the application of assessment methods on ERTMS test sites

- Two User Group Meetings with the aim of reaching relevant actors in the European rail industry, especially those involved in ERTMS were organised.

EMSET: Functional EUROCAB component validation on the Madrid-Sevilla line.

Aim: To perform the preparatory activities conducive to a full-scale functional validation of the onboard ERTMS subsystem. Such validation includes interoperability tests via several external specific transmission modules with some main existing signalling systems used in Europe.

ERTMS Tests: ERTMS test preparation.

Aim: The project addresses the full range of preparation activities leading to full scale trial tests of the European Rail Traffic Management System in a number of pilot sites to be located in France, Germany and Italy. This includes the functional, system and subsystem specification as well as an overall safety concept. Aspects on ergonomics and automation will be addressed.

EUROSIG: Development of the complete ERTMS concept.

Aim: The main objective of EUROSIG is the development of a European wide common concept for a railway safe signalling system. EUROSIG should demonstrate the technical feasibility of the ERTMS system concept as well as establish a common approach to assess the system safety.

HUSARE/SAFETY: Human safe rail in Europe –managing the human factor in multi-cultural and multi-lingual rail environments.

Aim: To establish a common method for evaluating and improving human management in order to increase safety and reliability for European cross-border railway lines. A risk based approach will be adopted to ensure that the effort associated with standardising rules and operational procedures will be directed at those aspects of railway operations which are most critical in terms of the risks that could arise if human errors occur.

HUSARE was finalised in January 2000 and developed methodologies for analysing risk associated with human factors in situations involving the use of differing languages, regulatory frameworks etc. The results will serve as a starting point for improved methods for training crews for operating cross-border services.

INFOSTAT: Information systems.

Aim: To develop a methodology for establishing transport databases and information systems required for strategic transport planning at a European level.

Results: INFOSTAT has defined the principles and concepts for ETIS, assessed the adequacy of existing data, and prioritised the data gaps requiring immediate action.

5th RTD Framework Programme 5th Call (1998-2002)

The Commission launched on 01-06-2001 the 5th Call of Proposals and the deadlines are set in each call text. The usual duration is 18, 24 or 36 months (see also http://www.cordis.lu/growth).

Rail safety research is a key safety action in the Commission's programme.

The main issues covered by this report are the following:

New approach to railway safety management

Problem: The current railing system has several deficiencies:
- Lack of explicit targets for safety. Primary target: prevention of fatalities
- Deficient accident reporting systems
- Lack of rational analysis of the activities in safety improvements after accidents
- Lack of valid research and reluctance to publish results.

Aim: to establish networking and research activities that can ensure the necessary improvements in accordance with the needs outlined in the new directive on railway safety.

The work to be undertaken will be divided into three subtasks:

Subtask 1: Thematic Network on railway safety and interoperability.
The Thematic Network should cover the following activities:

- Bring together all relevant stakeholders in the field of railway safety, e.g. railway companies, national rail safety authorities and international organisations and groupings such as the international railway union (UIC), the Community of European Railways (CER), the union of railway industries (UNIFE), the European railway interoperability association (AEIF), the European Transport Safety Council (ETSC) and the International Liaison Group of Government Railway Inspectorates (ILGGRI).
- Identify the most promising results of safety related research activities and recommend which steps should be done in order to establish a new optimised safety approach.
- Moderate a constructive dialogue and provide secretarial assistance with the aim of reaching consensus and agreements that can lead to harmonised European standards.

Subtask 2: Development of a new approach to railway safety management based on risk assessments, cost/benefit evaluation and a new approach to the use of rulebooks and safety regulations.
The research/studies should cover the following activities:

- Develop the new safety approach for railways by making use of elements known from other industries and other modes of transport (e.g. air) .
- Develop methodologies for risk based and quantifiable safety assessment and conduct cost-benefit analyses.

- Propose acceptable levels of risk (setting of targets).
- Definition of a proper incident and accident reporting system at the EU and national levels.
- Common European activities related to the updating of the rulebooks based on current revisions in Member States. This should include an assessment of the role of rules and rule books in railway safety and recommendations for a common EU approach to unification of relevant rules (objective: minimum set of common rules)
- Identification of best practise in terms of achieved safety level and costs.

Subtask 3: Training concepts for improved cross-border train operations.
The main focus of this task should be on the development of solutions to achieve the interoperability of "train crews" involved in cross border operations with particular emphasis in practical problems such as: differences in the areas of language, left/right side driving, safety philosophies, operating rules and route characteristics. The work should include the assessment and integration of simulator systems and concepts. This could either include the adaptation of existing simulators/multimedia tools or the use of new technical developments from other Key Actions.

The new tools should be validated and demonstrated in the railway environment as part of a new training concept and a new system for certification of train crew competence in accordance with the new communication and directive on interoperability of conventional rail.

It could also include the development of suitable training courses for train crews and traffic control staff, which address the use of a common language and common operational procedures in both normal and degraded mode operations as well as in emergency situations. In addition to the main priorities described above, the work could also be extended to cover other

staff involved in handling of cross-border train operations, for instance: "station", "terminal", "train preparation", and "maintenance" staff.

Expected results: **To create a new safety approach on a European level and assist in the development of TSI. Other relevant objectives are:**
- **Guidelines for risk analysis**
- **Minimum set of common rules**
- **Guidelines for an EU incident and accident reporting system and database including accessibility to these data.**

New approach to a more efficient use of infrastructure

Problem: **Lack of compatibility regarding timetable planning, slot allocation, charging system and performance regime.**

Projects: **EUROPE-TRIS promotes the use of teleconferencing to adjust the timetables every month· OPTIRAILS focus on real-time traffic management, re-allocation problems and data exchange.**
The work to be undertaken will be divided in three subtasks:

Subtask 3: Clustering activity.
The clustering work should cover the following activities:
- **Establish a common user group for the demonstration projects**
- **Develop and use common methods/approaches for the evaluation of the results of the demonstration projects (for instance based on the recommendations from the FP4 MAESTRO project)**
- **Develop appropriate monitoring solutions for the monitoring of the rail transport services, in particular: monitor the use of the networks and the evolution of the framework conditions (infrastructure charging, capacity allocation, safety regulation and performance, licensing, rail transport market development, benchmarking/performance indicators). Set up the framework for a future European railway monitoring regime (identify the data**

requirements as a basic source for decision making on national and European level, and organisational aspects such as tasks, staff and budget to be considered).

Expected results: **A demonstrator that will set standards for other corridors, the establishment of a European rail database and independent monitoring solutions to analyse the evolution of rail transport services.**

Service reliability and data exchange for cross-border freight trains

Problem: **Lack of compatibility concerning technical standards, equipment, safety rules and operational procedures.**

Projects: **TEDIM aims to increase the use of electronic data transfer and at the same time to create new operational methods.**

Expected results: **To establish a European service provider similar to RAILINC in North America and to set common rules concerning various rail procedures.**

European Transport policy Information System (ETIS)

Project: **ETIS will be an information system of integrated tools (decision support, modelling, presentation tools-GIS, databases etc.) to assist policy makers at European level to analyse transport related strategic issues.**

The ETIS will be based on information flows coming from different sources. The transport information agent will be the interface level of the ETIS between the user and the data sources. It will possess the following 5 characteristics:
- It will be a communication facilitator passing information to different information systems,
- It will have filtering capabilities in order to deal with confidential information,
- It will be capable of doing basic arithmetic operations,
- It will be an object-oriented information translator bridging

information based on different platforms,
- It will be an integrator and compiler of various information elements.

Results: Development of a software tool that should be tested in a pilot case study, linking and automatically processing data from selected transport information systems or data deriving from relevant tools (decision support, modelling etc.). This tool will be the user key access to the ETIS system.

Institutional issues

Problem: The differences in institutional structures can lead to delays and modifications to the policy implementation.

Aim: To develop a framework for the analysis of the decision making processes and the different roles of decision making governing bodies have in implementing transport policies. The task includes the identification of the problem, then the analysis and finally the proposal of possible combinations of Member States and European actions that would best facilitate the implementation of transport policy.

Freight intermodal transport operations

Problem: The secure and safe cross border intermodal transportation of goods is a major problem for transport operators, either when transporting the goods (on different transport means), when crossing borders, or when leaving the units unattended.

The lack of security reduces the attractiveness of intermodal transport. Safe transportation is important for the staff involved and for the protection of the environment especially when moving dangerous goods in transport operations or in terminals. The different rules and practices that are used in the individual transport modes and different Member States creates extra burdens where intermodal services are concerned.

Aim: To consider the human factors in safety problems and develop support systems for operatives to improve

safety and reduce or mitigate the effects of accidents.

Secondly to improve the security of intermodal transport units, particularly against theft and damages either inside terminals or during the transport.

Finally to build consensus on promising harmonised safety and security procedures and techniques when using intermodal transport. To help move towards common national and international standards to support cross border intermodal transport, vehicles, terminals etc.
For further information, see European Commisison:
http://europa.eu.int/comm/transport/extra
6th Framework Programme

The European Commission is currently working on its new framework programme. ETSC has submitted a proposal for a transport safety research strategy (www.etsc.be).

A prime need in EU rail safety research is for the assembly and analysis of accident data at the European level. Much of these data already exist at the national level, but there are no satisfactory analyses at the European level. Such data are needed not only to support the European-level policy initiatives, but also to enable the national railways to learn from each other's experience with regard to common problems, such as level crossings or trespassers. The recent statistical regulations will assist with the provision of statistics, but it is not retrospective, and it will not provide an accident database.

More detailed research is needed into the nature of the differences between the various national railway safety requirements, the extent to which they are compatible or incompatible, and the scope for cost-effective harmonisation measures to improve safety.

Research on risk assessment methodologies for use on railways, including cost benefit analysis, and learning from the methods used both in other transport modes, and in other European regulated industries such as the process industries is required.