



The European Union's Tacis TRACECA programme
for Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey,
Turkmenistan, Ukraine, Uzbekistan

Review of Railways Rehabilitation in Central Asia

for Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan

Final Report Module A

Annexes

November 2004



This project is funded by
the European Union



A project implemented by
Italferr S.p.A.

Annex 3.1 Collected information

Information

- 1.1 Socio-economic data for the country (population, GDP, foreign trade, CPI - consumer price index, deflator). (Form 1.1)
- 1.2 Socio-economic data by Region (population, GDP, foreign trade, CPI - consumer price index, deflator). (Form 1.2)
- 1.3 Data about Production of Main Commodities by Region. (Form 1.3)
- 1.4 Customs Code of the country; Customs regulations connected with border crossing; Border Law of the country (the law which regulates the type of checking to be performed at the borders with regard to Customs, Police border, Health, Sanitary, etc.); Bilateral Agreements with Railway Administrations of neighbouring countries regarding border crossing procedures; existing procedures and co-operation agreements between State Bodies of the country.
- 1.5 Technical specifications and rules for building lines, for building signalling and telecommunications plants, for permanent way, for providing materials and for train operation in particular with regard to safety and security standards for the transportation of dangerous goods and oil products.
- 1.6 Information about standards for rolling stock, lines, plants, materials and for providing materials and rolling stock.

Информация

- 1.1 Социально-экономические данные по государству (население, ВВП, международная торговля, CPI – индекс потребительских цен, дефлятор). (Форма 1.1)
- 1.2 Социально-экономические данные по региону (население, ВВП, международная торговля, CPI – индекс потребительских цен, дефлятор). (Форма 1.2)
- 1.3 Данные о производстве товаров народного потребления по Региону. (Форма 1.3)
- 1.4 Таможенный Кодекс страны; Таможенные инструкции по пересечению границ; государственный Закон о Границе (закон, который регулирует типы проверки на границе во взаимодействии с Таможней, Паспортным контролем, Охраной Здоровья, Санитарией и пр.); Двусторонние соглашения между Железнодорожными Администрациями соседних стран по вопросам пересечения границ; существующие процедуры и соглашения о сотрудничестве между Государственными Структурами страны.
- 1.5 Технические характеристики и нормы строительства железных дорог, строительства устройств сигнализации и связи, верхнего строения пути, обеспечение запасными материалами и движения поездов, в частности в вопросах стандартов безопасности транспортировки взрывоопасных и легковоспламеняющихся грузов (опасных грузов и нефтепродуктов).
- 1.6 Информация о стандартах по подвижному составу, линий, оборудования, материалов и по обеспечению запасными частями и подвижным составом.

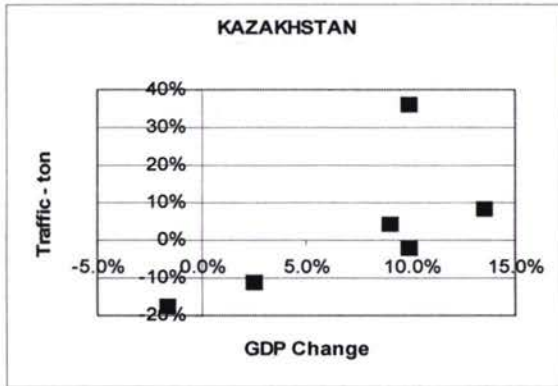
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| 1.7 Data about multimodal terminals, trains, operability and interoperability. (Form 1.7) | 1.7 Данные о межтранспортных терминалах, поездах, удобстве использования и совместимости операций. (Форма 1.7) |
| 1.8 Typical sections drawings; permanent way elements typical drawings (section on straight line, on curve, rails, concrete and wooden sleepers, fastenings and components, joints, turnouts and components, scheme of long welded bar, lay out and section of level crossings, box culverts, ditches, etc) | 1.8 Типовые чертежи участков; типовые чертежи верхнего строения пути (секции на стандартных участках, на кривых, рельсы, железобетонные и деревянные шпалы, крепеж и его составляющие, стыки, стрелки и их составляющие, схемы безстыковых секций, трассы и секции железнодорожных переездов, труб, канализационных коллекторов и т.д.) |
| 2.1 Railway Statistics on Assets (tracks and Staffing. (Form 2.1) | 2.1 Железнодорожная статистика по Активам (путь, здания, подвижной состав) и укомплектовке персоналом. (Форма 2.1) |
| 2.2 Railway Statistics on Rolling Stock. (Form 2.2) for sections mentioned in par. 3 | 2.2 Железнодорожная статистика по подвижному составу. (Форма 2.2) для участков, описанных в параграфе 3. |
| 2.3 Workshops and maintenance of rolling stocks (Form 2.3) for sections mentioned in par. 3 | 2.3 Депо и пункты технического обслуживания подвижного состава (Форма 2.3) для участков, описанных в параграфе 3. |
| 2.4 Railway Network Characteristics (length, signalling systems, traction type, maximum train load for each section. (Form 2.4) | 2.4 Характеристики Сети Железных Дорог (длина, сигнализация, система, тип тяги, максимальная нагрузка на ось) для каждого участка. (Форма 2.4) |
| 2.5 Maintenance activities and equipment (permanentway,safety/signalling/telecommunication/electrification plants) (Form 2.5) for sections mentioned in par. 3 | 2.5 Работы по техническому обслуживанию и оборудование (верхнее строение пути, устройства безопасности / сигнализации/ связи/ энергоснабжения) (Форма 2.5) для участков, описанных в параграфе 3. |
| 2.6 Data about train travel time (Form 2.6) | 2.6 Данные по времени движения поездов (Форма 2.6) |
| 2.7 Passenger and freight train movements in the border stations. (Form 2.7) | 2.7 Движение пассажирских и грузовых поездов по пограничным станциям. (Форма 2.7) |
| 2.8 Statistical data about train delays at border stations per causes (Form 2.8) | 2.8 Статистические данные о задержках поездов на пограничных станциях по причинам их возникновения (Форма |

- 2.8).
- 2.9 Information about the border crossings: state bodies involved, administrative and technical actions taken in specific border crossing points, communication system, level of IT implementation; existence of joint commissions (Information collected through interviews with sub-consultant experts).
- 2.9 Информация о точках пересечения границы: задействованные государственные структуры, административные и технические процедуры, принятые на конкретной точке пересечения границы, средства связи, уровень задействования СВТ; наличие совместных комиссий (Информация получена во время переговоров с экспертами Субконсультанта).
- 3.1 Freight Transport Statistics by Mode. (Form 3.1)
- 3.1 Статистика по Грузопотокам. (Форма 3.1)
- 3.2 Passenger Transport Statistics by Mode. (Form 3.2)
- 3.2 Статистика по Пассажиропотокам. (Форма 3.2)
- 3.3 Railway statistics on traffic (passenger and freight) and revenue. (Form 3.3)
- 3.3 Статистика по железнодорожному движению (пассажирскому и грузовому) и прибыль. (Форма 3.3)
- 3.4 Railway statistics on traffic by commodity. (Form 3.4)
- 3.4 Железнодорожная статистика по видам грузов. (Форма 3.4)
- 3.5 Railway traffic density by section (Form 3.5)
- 3.5 Объемы железнодорожного движения по участкам (Форма 3.5)
- 3.6 Railway traffic flows for 10 commodity groups (Form 3.6)
- 3.6 Объемы железнодорожных перевозок по 10 группам товаров (Форма 3.6)
- 3.7 Data about International Trade Flows – Export, by destination and commodity for each mode. (Form 3.7)
- 3.7 Данные по Международным Торговым Потокам – Экспорт, по назначению и по видам грузов. (Форма 3.7)
- 3.8 Data about International Trade Flows – Import, by destination and commodity for each mode. (Form 3.8)
- 3.8 Данные по Международным Торговым Потокам – Импорт, по назначению и по видам грузов. (Форма 3.8)
- 3.9 Data about International Trade Flows – Transit, by origin, destination and commodity for each mode. (Form 3.9)
- 3.9 Данные по Международным Торговым Потокам – Транзит, по происхождению, назначению и по видам грузов. (Форма 3.9)
- 3.10 Container Movements in Railway Terminals by container size (Form 3.10)
- 3.10 Передвижения контейнеров через железнодорожные терминалы по типоразмерам контейнеров (Форма 3.10)

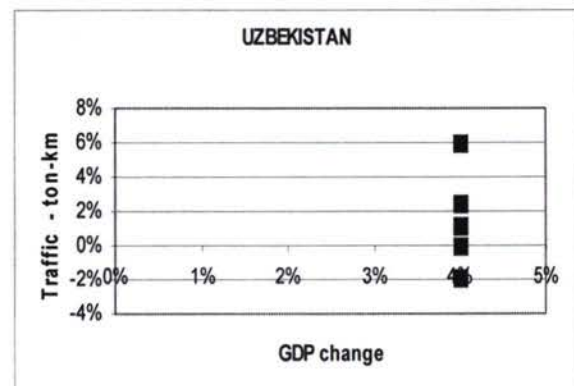
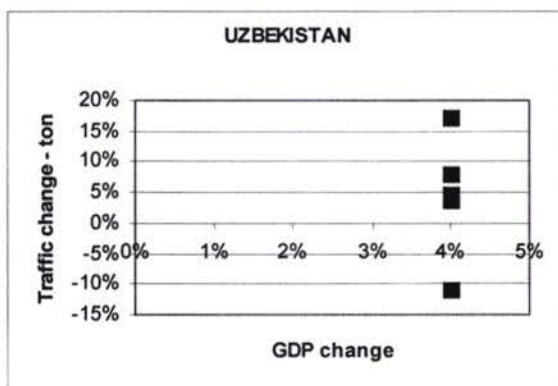
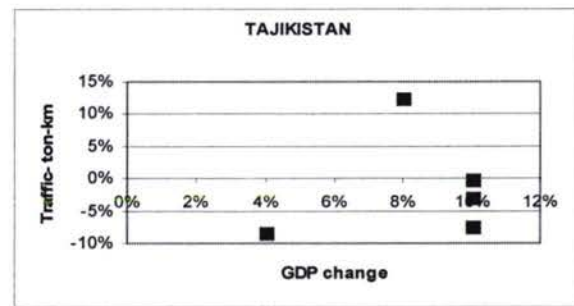
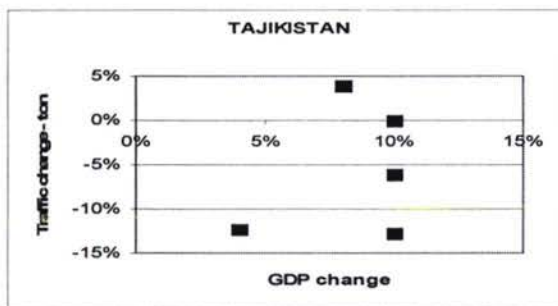
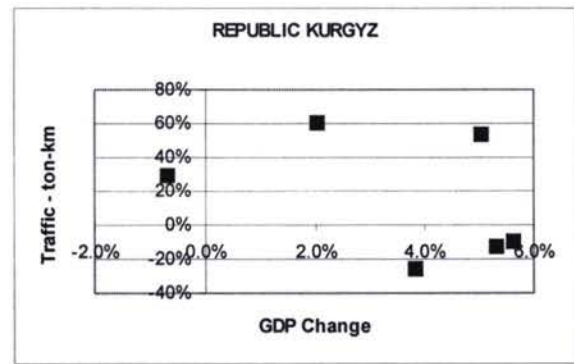
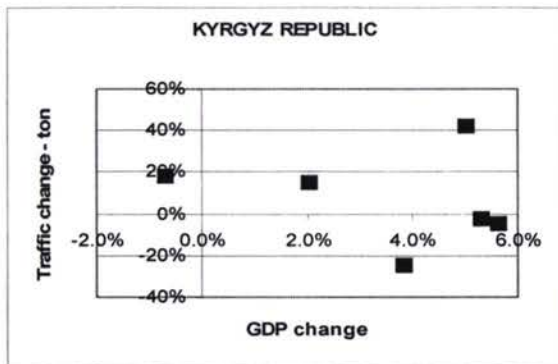
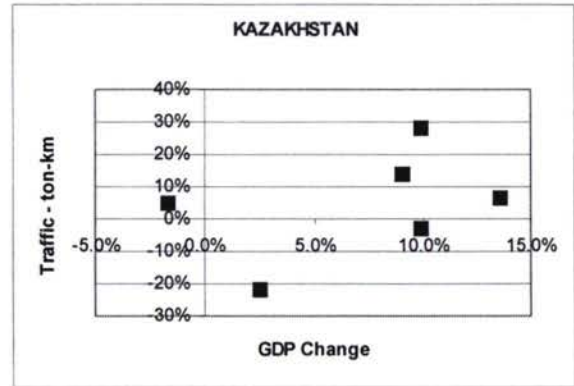
Annex 4.1

Analysis of correlation between traffic and GDP changes

Correlation Traffic (ton) - GDP



Correlation Turnover (ton-km) - GDP



Annex 4.2

Forecasts of traffic through the international border station Dostyk (Druzhba) – Alashankou

Forecasts of traffic through the international border station Dostyk (Druzhba) – Alashankou

(Thousand tons)

Commodity type	Years										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Traffic to PRC (Druzhba/Dostyk – Alashankou)											
Crude oil	1800	2200	2500	3000	3000	3000	3000	3500	3500	3500	3500
Scrap metal	1200	1000	1000	700	500	500	500	500	500	500	500
Non-ferrous metals	250	300	350	400	450	500	550	600	600	600	600
Ferrous metals	2200	2500	3000	3000	3200	3500	3500	3500	4000	4000	4000
Cotton	50	50	50	50	50	50	50	50	50	50	50
Containers	120	150	200	250	250	300	320	350	350	350	350
Fertilizer	200	200	200	200	200	200	200	200	200	200	200
Others	600	700	750	800	820	850	900	1000	1050	1100	1500
Total to PRC	6440	7200	8150	8520	8620	9100	9290	10020	10600	10700	11120
Traffic from PRC to Kazakhstan (Alashankou – Druzhba/Dostyk)											
Foodstuff	35	30	25	20	20	20	20	20	20	20	20
Chemicals	100	120	150	200	200	250	300	350	350	400	400
Containers	150	170	250	300	300	350	400	450	500	500	500
Coke	350	400	450	500	510	520	550	600	600	650	670
Equipment	45	45	45	50	60	70	75	80	90	100	100
Construction mat.	35	30	30	30	30	30	30	30	30	30	30
Others	230	250	300	320	350	400	450	500	550	600	700
Total from PRC	945	1045	1250	1420	1470	1640	1825	2030	2140	2300	2420
Grand Total (Export+Import)	7385	8245	9400	9940	10090	10740	11115	12050	12740	13000	13540
Including Transit	1300	1600	1900	2100	2300	2500	2800	3000	3200	3300	3500
Transit share, %	17,6	19,4	20,2	21,1	22,8	23,3	25,2	24,9	25,1	25,4	25,8

Source: SJSC KTZ - 2003

Annex 8.1

**Pictures from Dostyk
(Druzhba) / Alashankou rail
border cross**



Alashenkoy



Dostyk

Annex 8.2

List of border international- railway crossing stations of Uzbekistan

*State Joint Stock Railway Company
“O‘zbekiston Temir Yo‘llari ”*

To: Polish State Railways

OSJD Committee

28.05.2004
Ref № NI-5916

Hereby “Uzbekiston Temir Yullari” sends you the list of border international-railway crossings between railway administration of the states that border with Uzbekistan for the purpose of setting a unified international code and their introduction to the library of control objects and to the tables of International Transport Tariff of transit distances of Uzbek railways:

1. Border joint points with railways of Kazakhstan (KZT):

Keles (UTY)- Sari Agash (KZT)
Sirdarinskaya (UTY)- Pahtaaral (KZT)
Karakalpakiya (UTY) – Oazis (KZT)

2. Border joint points with Turkmen railways (TRK):

Nishan (UTY) – Talimardjan (TRK)
Hojadavkat (UTY)-Farap (TRK)
Boldir (UTY)- Raz‘ezd-161 (TRK)
Naymankul (UTY) – Tahiatash (TRK)
Jumurtay (UTY)- Kubadag (TRK)
Pitnyak (UTY) – Gazodjak (TRK)
Shavat (UTY) - Doshhovuz (TRK)

3. Border joint points with Tajik railways (TAJ):

Bekabad (UTY)- Nau (TAJ)
Suvonobod (UTY) – Kanibadam (TAJ)
Amuzang (UTY) – Hoshodi (TAJ)
Sari-Asiya (UTY)- Pahtaabad (TAJ)

4. Border joint points with Kyrghyz railways (KRG):

Kuvasay (UTY) – Point 38 km (KRG)
Savay (UTY)- Karasu-Uzbekskiy (KRG)
Hanabad (UTY) – Djalal-Abad (KRG)
Sultanabad (UTY) – Karasy-Uzbekiskiy (KRG)
Uchkurgan (UTY) –Shamaldisay (KRG)

5. Border joint points with Afghanistan (AFG)

Galaba (UTY)- Hayraton (AFG)
Termez-port (exp) (UTY) – Hayraton port (AFG)

Deputy chairman of company board /signature/

Annex 8.3

Protocol between the General Department of Customs from Romania and SNTFM “CFR Marfă” SA (Romanian National Railway Freight Transport Company) regarding the application of the simplified transit procedure for goods transported on railway

Ministry of Finance
General Department of Customs
Street Marci Millo, no. 13,
district 1, Bucharest

SNTFM “CFR – Marfă” SA
Bd. Dinicu Golescu, no. 18
district 1, Bucharest

Registration Number: 51373/01.11.2000

PROTOCOL

Between the General Department of Customs and SNTFM “CFR Marfă” SA
regarding the application of the simplified transit procedure for goods transported
on railway

Taking into account the dispositions of the art. 94 from the European Agreement of Romania’s Association to the European Union, ratified by the Law no. 20/1993, regarding the necessity of Romania’s interconnection to the common transit system established between the European Union and the countries of the European Association of Free Trade,

Taking into consideration the dispositions stipulated at point 5 of the position document for chapter 25 “Customs Union” opened within the negotiations of Romania’s accession to the EU, in which it is stipulated our country’s engagement to generalize, until the end of the year 2000, the application of the stipulations of the Common Transit Convention for goods transported on railway,

Taking into account the stipulations of the art. 48, paragraph 2 and 3 from the Application Regulation of Romania’s Customs Code, approved by Government Decision no. 626/1997

Taking into consideration the stipulations of the art. 6, paragraph 1 from SNTFM “CFR Marfă” SA Status approved by Government Decision no. 582 / 1998,

The sides agree on the following:

Art. 1. For the goods transported by SNTFM “CFR Marfă” SA loaded in wagons that circulate in external transit, between two border customs offices, the CIM railway bill on which the customs authority stamps “Customs Transit” has the value of a transit customs declaration. For the goods loaded on UTI (intermodal transport units) the TR forwarding bulletin on which the customs authority stamps “Customs Transit”, has the value of a transit customs declaration.

Art. 2. For the transports stipulated at art. 1 SNTFM “CFR Marfă” SA becomes obligatory the main responsible for the correct unfolding of the transit operations.

Art. 3. The CIM railway bill or, depending on the case, the TR the forwarding bulletin to which the customs authority has granted free of customs by applying the transit stamp, represents executory title for the persuing and cashing of the customs duty.

Art. 4. SNTFM “CFR Marfă” SA will supervise the unfolding and concluding of the common transit operations through its own accountancy centre.

Art. 5. For the verification of the unfolding and concluding of the transit operations, SNTFM “CFR Marfă” SA, at the customs authority’s solicitation, will put at its disposal, in the accountancy centre, all the photocopies of the railway bills / the TR forwarding bulletins. There will also be presented, in a maximum 7 day term, other documents out of which the operations that were concluded should result (the goods delivery register, the transit list etc).

Art. 6. At least once a month the customs authority will make at the accountancy centre of SNTFM “CFR Marfă” SA a verification, according to its own control norms, of the transit operations unfolded under the coverage of the railway bills / forwarding bulletins, whose photocopies are preserved in the accountancy centre.

Art. 7. For further control, the photocopies of the railway bills / TR forwarding bulletins will be archived in the accountancy centre for a 5 year period from the granting of the free of customs.

Art. 8. Both sides will apply measures of decreasing the time of staying of the wagons loaded with foreign goods which convey in transit Romania. These measures will also be included in the common regulations established between the border stations and the border customs offices.

Art. 9. The application of the simplified transit procedure for the goods transported on the railway will be made by complying with the international conventions to which our country is signatory side (The COTIF Convention, the Convention regarding the harmonization of the goods control at border, etc.).

Art. 10. Until the operative date of the present Protocol, the General Department of Customs will elaborate the Methodological Norms of application of the simplified transit procedure for the goods transported on railway.

Art. 11. The extension of the simplified procedure for the goods loaded in cars, transported in transit between all the customs offices with railway activity in the country, will be made subsequently at a date established on a common agreement by the two sides.

Art. 12 The present protocol will become operative on the 20th of November of 2000.

General Department of Customs

General Director,

Regulations and Customs Procedures Department

Judicial and Customs Legislation Department

Chief of Transit and Customs Conventions Department

SNTFM “CFR Marfă” SA

General Director,

Commercial Director,

Annex 8.4

**International Convention on
Mutual Administrative
Assistance in Customs
Matters, Brussels June, 27th
2003**

INTERNATIONAL CONVENTION ON MUTUAL ADMINISTRATIVE ASSISTANCE IN CUSTOMS MATTERS

Brussels – 27 June, 2003

WORLD CUSTOMS ORGANIZATION

Rue du Marché, 30

B-1210 Brussels

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**INTERNATIONAL CONVENTION
ON MUTUAL ADMINISTRATIVE ASSISTANCE
IN CUSTOMS MATTERS**

Preamble

THE CONTRACTING PARTIES to this Convention, established under the auspices of the Customs Co-operation Council, now known as the World Customs Organization, Recognizing that closer co-operation between Customs administrations is a principal aim of the Convention establishing a Customs Co-operation Council;

Convinced that more effective co-operation between Customs administrations can be achieved through the goodwill of the Contracting Parties;

Considering the importance of the accurate assessment of Customs duties and other taxes and of ensuring proper enforcement by Customs administrations of prohibitions, restrictions and measures of control in respect of specific goods;

Considering that offences against Customs law are prejudicial to the security of the Contracting Parties and their economic, commercial, fiscal, social, public health and cultural interests;

Taking into account the threat of transnational organized crime and terrorist groups with their substantial resources and the need to effectively combat them;

Recognizing the increased global concern for the security and facilitation of the international trade supply chain and the Customs Co-operation Council's Resolution of June 2002 to that effect;

Recognizing the importance of achieving a balance between compliance and facilitation to ensure the free flow of legitimate trade and to meet the needs of governments for the protection of society and revenues;

Convinced that international trade will be facilitated by the adoption of modern control techniques, such as risk management, by Customs administrations;

Recognizing that the international exchange of information is an essential component of effective risk management and that such exchange of information should be based on clear legal provisions;

Taking into account the International Convention on Mutual Administrative Assistance for the Prevention, Investigation and Repression of Customs Offences, adopted at Nairobi on 9 June 1977 under the auspices of the Customs Co-operation Council, which lays down a framework to facilitate mutual administrative assistance in Customs matters;

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Taking into account the United Nations Convention against Transnational Organized Crime, adopted at New York on 15 November 2000 and for which the High-Level Political Signing Conference was held in Palermo from 12 to 15 December 2000, which lays down a framework for international mutual assistance in criminal matters with a view to preventing and combating transnational organized crime;

Having regard to international Conventions containing prohibitions, restrictions and measures of control in respect of specific goods;

Having regard to the United Nations Universal Declaration of Human Rights of 1948;

Have agreed as follows :

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CHAPTER I

Definitions

Article 1

For the purposes of this Convention :

(a) "Administrative Committee" shall mean the Committee responsible for the management of this Convention as established in Article 45;

(b) "Council" shall mean the organization set up by the Convention establishing a Customs Co-operation Council, done at Brussels on 15 December 1950 and entered into force on 4 November 1952;

(c) "Council officer" shall mean any officer or employee of the Council and any other person designated by the Secretary General to perform functions for the purposes of this Convention;

(d) "cross-border co-operation" shall mean the co-operation between the Customs administrations of the Contracting Parties across their respective borders;

(e) "Customs administration" shall mean the Customs authority and any other authority of a Contracting Party authorized under national law and designated by that Contracting Party to apply any provision of this Convention;

(f) "Customs claim" shall mean any amount of Customs duties that cannot be collected in one of the Contracting Parties;

(g) "Customs duties" shall mean all duties, taxes, fees or any other charges which are levied in the territories of the Contracting Parties in application of Customs law, but not including fees and charges for services rendered;

(h) "Customs law" shall mean any legal and administrative provisions applicable or enforceable by the Customs administration of a Contracting Party in connection with the importation, exportation, transshipment, transit, storage and movement of goods, including

legal and administrative provisions relating to measures of prohibition, restriction and control, and to combating money laundering;

(i) "Customs offence" shall mean any breach, or attempted breach, of a Contracting Party's Customs law;

(j) "Customs or Economic Union" shall mean a Union, constituted by and composed of Members, which has competence to adopt its own regulations that are binding on those Members in respect of matters governed by this Convention, and has competence to decide, in accordance with its internal procedures, to sign, ratify or accede to this Convention;

(k) "Enforcement Committee" shall mean the Enforcement Committee of the Council;

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(l) "information" shall mean any data, whether or not processed or analysed, and documents, reports, and other communications in any format, including electronic, or certified or authenticated copies thereof;

(m) "international trade supply chain" shall mean all processes involved in the cross-border movement of goods from the place of origin to the place of final destination;

(n) "official" shall mean any Customs officer or other government agent designated by a Customs administration;

(o) "person" shall mean both natural and legal persons, unless the context otherwise requires;

(p) "personal data" shall mean any data concerning an identified or identifiable natural person;

(q) "ratification" shall include acceptance or approval;

(r) "requesting administration" shall mean the Customs administration which requests assistance;

(s) "requested administration" shall mean the Customs administration from which assistance is requested;

(t) "requesting Contracting Party" shall mean the Contracting Party whose Customs administration requests assistance;

(u) "requested Contracting Party" shall mean the Contracting Party whose Customs administration is requested to provide assistance;

(v) "Secretary General" shall mean the Secretary General of the Council.

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CHAPTER II

Scope of the Convention

Article 2

1. Contracting Parties shall, through their Customs administrations, provide each other with administrative assistance under the terms set out in this Convention, for the proper application of Customs law, for the prevention, investigation and combating of Customs offences and to ensure the security of the international trade supply chain.

2. Any activity carried out under this Convention by a Contracting Party shall be in accordance with its legal and administrative provisions and within the limits of its Customs administration's competence and available resources.

3. Each Contracting Party shall notify the Secretary General of the authorities, referred to in Article 1 (e), authorized under national law and designated by that Contracting Party to apply any provision of this Convention. The Secretary General shall communicate this information and any updates thereof to the other Contracting Parties.

4. This Convention only covers mutual administrative assistance between the Contracting Parties and is not intended to have an impact on mutual legal assistance agreements between them. If mutual assistance is to be provided by other authorities of a requested Contracting Party, the requested administration shall indicate those authorities and, where known, the relevant agreement or arrangement applicable.

5. The provisions of this Convention shall not give rise to a right on the part of any person to impede the execution of a request for assistance.

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CHAPTER III

General Assistance Procedures

Article 3

Communication of Requests

1. Requests for assistance under this Convention shall be communicated directly between the Customs administrations concerned. Each Customs administration shall designate an official contact point for this purpose and shall provide details thereof to the Secretary General. The Secretary General shall communicate this information and any updates thereof to the other Customs administrations.

2. Requests for assistance under this Convention shall be made in writing or electronically, and shall be accompanied by any information deemed useful for the purpose of complying with such requests. The requested administration may require written confirmation of electronic requests. Where the circumstances so require, requests may be made verbally. Such requests shall be confirmed as soon as possible either in writing or, if acceptable to the requested and requesting administrations, by electronic means.

3. Requests shall be made in a language acceptable to the Customs administrations concerned. Any documents accompanying such requests shall be translated, to the extent necessary, into a mutually acceptable language. The requested administration shall in any case accept requests for assistance and accompanying documents in one of the official languages of the Council which it may specify.

4. Requests made pursuant to paragraph 2 of this Article, shall include the following details :

- (a) the name of the requesting administration;
 - (b) the matter at issue, type of assistance requested, and reasons for the request;
 - (c) a brief description of the case under review and the legal and administrative provisions that apply;
 - (d) the names and addresses of the persons to whom the request relates, if known;
 - (e) a reference in accordance with paragraph 2 of Article 42, if applicable;
 - (f) the verifications made in accordance with paragraph 2 of Article 7.
5. Where the requesting administration requests that a certain procedure or methodology be followed, the requested administration shall comply with such a request, subject to its national legal and administrative provisions.

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Article 4

Spontaneous Assistance

In cases that could involve substantial damage to the economy, public health, public security, including the security of the international trade supply chain, or other vital interests of any Contracting Party, the Customs administration of any Contracting Party shall, wherever possible, supply assistance on its own initiative without delay.

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CHAPTER IV

Information

Article 5

Information for the Application and Enforcement of Customs Law

The Customs administrations shall provide each other, either on request or on their own initiative, with information which helps to ensure proper application of Customs law and the prevention, investigation and combating of Customs offences and to ensure the security of the international trade supply chain. Such information may include :

- (a) new enforcement techniques having proved their effectiveness;
- (b) new trends, means or methods of committing Customs offences;
- (c) goods known to be the subject of Customs offences, as well as transport and storage methods used in respect of those goods;
- (d) persons known to have committed a Customs offence or suspected of being about to commit a Customs offence;

(e) any other data that can assist Customs administrations with risk assessment for control and facilitation purposes.

Article 6

Information Relating to Customs Offences

The Customs administration of a Contracting Party shall provide the Customs administration of any other Contracting Party concerned, either on its own initiative or on request, with information on activities, planned, ongoing, or completed which provide reasonable grounds to believe that a Customs offence has been committed or will be committed in the territory of the Contracting Party concerned.

Article 7

Information for the Assessment of Import or Export Duties and Taxes

1. On request, the requested administration shall, without prejudice to Article 42, in support of the proper application of Customs law or in the prevention of Customs fraud, provide information to assist a requesting administration that has reasons to doubt the truth or accuracy of a declaration.

2. The request shall specify the verification procedures that the requesting administration has undertaken or attempted and the specific information requested.

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Article 8

Particular Types of Information

On request, the requested administration shall provide the requesting administration, who has reason to doubt the accuracy of information provided to it in a Customs matter, with information relative to :

(a) whether goods imported into the territory of the requesting Contracting Party have been lawfully exported from the territory of the requested Contracting Party;

(b) whether goods exported from the territory of the requesting Contracting Party have been lawfully imported into the territory of the requested Contracting Party and the Customs procedure, if any, under which the goods have been placed.

Article 9

Automatic Exchange of Information

Contracting Parties may, by mutual arrangement in accordance with paragraph 2 of Article 48, exchange any information covered by this Convention on an automatic basis.

Article 10

Advance Exchange of Information

1. Contracting Parties may, by mutual arrangement in accordance with paragraph 2 of Article 48, exchange specific information in advance of the arrival of consignments in their respective territories to ensure, in particular, the security of the international trade supply chain.

2. Such information shall, to the extent possible, comprise the following data elements :

- i. consignor or consignor code or exporter or exporter code;
- ii. description of goods or tariff code number;
- iii. UNGD number (dangerous goods code);
- iv. type of packages identification;
- v. number of packages;
- vi. measure unit qualifier;
- vii. total gross weight;
- viii. total invoice amount;
- ix. currency code;
- x. place of loading or place of loading code;
- xi. carrier identification or carrier name;
- xii. equipment identification number;
- xiii. equipment size and type identification;
- xiv. seal number;

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- xv. identification of means of transport crossing the border of the territory of the Contracting Party or code;
 - xvi. nationality of means of transport crossing the border of the territory of the Contracting Party or code;
 - xvii. conveyance reference number;
 - xviii. transport charges method of payment or code;
 - xix. Customs office of exit or code;
 - xx. country(ies) of routing or code;
 - xxi. first port of arrival or code;
 - xxii. date and time of arrival at first port of arrival in the territory of the Contracting Party or code;
 - xxiii. consignee or consignee code or importer or importer code;
 - xxiv. notify party or notify party code;
 - xxv. delivery destination;
 - xxvi. agent or agent code;
 - xxvii. Unique Consignment Reference Number.
3. The Administrative Committee shall have the authority to modify the list referred to in paragraph 2 of this Article.

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CHAPTER V

Special Types of Assistance

Article 11

Surveillance

1. On request, the requested administration shall, to the extent possible, maintain surveillance over and provide the requesting administration with information on :
- (a) goods either in transport or in storage known to have been used or suspected of being used to commit a Customs offence in the territory of the requesting Contracting Party;
 - (b) means of transport known to have been used or suspected of being used to commit a Customs offence in the territory of the requesting Contracting Party;
 - (c) premises known to have been used or suspected of being used in connection with the commission of a Customs offence in the territory of the requesting Contracting Party;
 - (d) persons known to have committed or suspected of being about to commit a Customs offence in the territory of the requesting Contracting Party, particularly those moving into and out of the territory of the requested Contracting Party.
2. The Customs administration of any Contracting Party may maintain such surveillance on its own initiative if it has reason to believe that activities planned, ongoing or completed appear to constitute a Customs offence in the territory of another Contracting Party.

Article 12

Controlled Delivery

1. Contracting Parties may, by mutual arrangement in accordance with paragraph 2 of Article 48, permit the movement of unlawful or suspect goods out of, through, or into their territories, with the knowledge and under the control of the Customs administration, with a view to investigating and combating Customs offences.
2. If such movements cannot be carried out under the control of the Customs authority, that authority shall endeavour to initiate co-operation with the national authorities that have such competence or shall transfer the case to them.

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Article 13

Notification

1. On request, the requested administration shall, if permissible under its national law, take all necessary measures to notify a person residing or established in its territory of all decisions taken by the requesting administration in application of Customs law concerning that person, that fall within the scope of this Convention.

2. Such notification shall be made in accordance with the procedures applicable in the territory of the requested Contracting Party for similar national decisions.

Article 14

Recovery of Customs Claims

1. On request, Customs administrations may afford each other assistance with a view to the recovery of Customs claims.

2. Detailed arrangements for assistance in recovering Customs claims shall be made between the Contracting Parties concerned, in accordance with paragraph 2 of Article 48.

Article 15

Experts and Witnesses

On request, the requested administration may authorize its officials to appear before a court or tribunal in the territory of the requesting Contracting Party as experts or witnesses in a matter related to the application of Customs law.

Article 16

Presence of Officials in the Territory of Another Contracting Party

On request, officials specially designated by a requesting administration may, with the authorization of the requested administration and subject to conditions the latter may impose, for the purpose of investigating a Customs offence :

- (a) examine, in the offices of the requested administration, documents and any other information in respect of that Customs offence, and be supplied with copies thereof;
- (b) be present during an inquiry conducted by the requested administration in the territory of the requested Contracting Party which is relevant to the requesting administration; these officials shall only have an advisory role.

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Article 17

Presence of Officials of the Requesting Administration at the Invitation of the Requested Administration

1. Where the requested administration considers it appropriate for an official of the requesting administration to be present when, pursuant to a request, measures of assistance are carried out, it may invite the participation of the requesting administration subject to any terms and conditions it may specify.

2. The Customs administrations concerned may, by mutual arrangement in accordance with paragraph 2 of Article 48, expand the role of the visiting official beyond an advisory one.

Article 18

Arrangements for Visiting Officials

1. Without prejudice to Articles 19, 20, 21, 22 and 23, when officials of a Contracting Party are present in the territory of another Contracting Party under the terms of this Convention, they must at all times be able to furnish, in a language acceptable to the requested administration, proof of their official identity and status in their Customs administration and of their official status as granted in the territory of the requested administration.

2. Officials shall, while in the territory of another Contracting Party under the terms of this Convention, be responsible for any offence they may commit and shall enjoy, to the extent provided by that Party's national laws, the same protection as accorded to its own Customs officers.

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CHAPTER VI

Cross-Border Co-operation

Article 19

General Provisions

Officials of a Contracting Party may, by mutual arrangement in accordance with paragraph 2 of Article 48, engage in any of the activities set out in this Chapter in the territory of another Contracting Party and in accordance with any additional conditions as may be stipulated by the Contracting Party in whose territory these activities take place. Any of these activities

shall cease as soon as the Contracting Party in whose territory the activities are taking place so requests.

Article 20

Hot Pursuit

1. Officials of a Contracting Party pursuing in their Party's territory an individual observed in the act of committing a Customs offence that could give rise to extradition, or participating in such an offence, may continue pursuit in the territory of another Contracting Party, subject to a prior request, authorization and any conditions the requested Contracting Party may impose.
2. If, for particularly urgent reasons, it has not been possible to inform the competent authorities of another Contracting Party prior to entry into its territory or where those authorities have not been able to engage in active pursuit, the pursuit may be continued without prior authorization.
3. Where pursuit is continued without prior authorization, the competent authorities of the Contracting Party in whose territory the pursuit is continued, shall be immediately informed of the crossing of the border and a formal request for authorization, outlining the grounds for crossing the border without prior authorization, shall be submitted as soon as possible.
4. At the request of the pursuing officials, the competent authorities of the Contracting Party where the pursuit is taking place shall challenge the pursued individual so as to establish his or her identity or to detain him or her.
5. Where the pursuit takes place on the sea, it shall, where it extends to the high sea, be carried out in conformity with the international law of the sea as reflected in the United Nations Convention on the Law of the Sea.

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Article 21

Cross-Border Surveillance

1. Officials of a Contracting Party, keeping under surveillance in their Party's territory a person about whom there are serious grounds to believe that he or she is involved in a Customs offence, may continue the surveillance in the territory of another Contracting Party subject to a prior request, authorization and any conditions the requested Contracting Party may impose.
2. If, for particularly urgent reasons, prior authorization cannot be requested, surveillance pursuant to paragraph 1 of this Article may be continued provided that the competent authorities of the Contracting Party in whose territory the surveillance is to be continued, are immediately informed of the crossing of the border and a formal request for authorization, outlining the grounds for crossing the border without prior authorization, is submitted as soon as possible.

Article 22

Covert Investigations

1. A requested Contracting Party may authorize officials of a requesting Contracting Party to investigate in its territory, under cover of false identities, to ascertain or clarify facts about a Customs offence where it would be extremely difficult to do so otherwise. The officials in question shall be authorized to collect information and to make contact with the subjects of investigations or other persons associated with them in the course of their investigative activities.
2. Such investigations shall be carried out in accordance with the law and procedures of the Contracting Party in whose territory the investigations are being conducted.

Article 23

Joint Control and Investigation Teams

1. Contracting Parties may establish joint control or investigation teams to detect and prevent particular types of Customs offences requiring simultaneous and co-ordinated activities.
2. Such teams shall operate in accordance with the law and procedures of the Contracting Party in whose territory the activities are being carried out.

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CHAPTER VII

Use, Confidentiality and Protection of Information

Article 24

Use of Information

1. Without prejudice to Article 36, any information communicated under this Convention shall be used only by the Customs administration for which it was intended and solely for the purpose of administrative assistance under the terms set out in this Convention.
2. On request, the Contracting Party that supplied the information may, notwithstanding paragraph 1 of this Article, authorize its use for other purposes or by other authorities, subject to any terms and conditions it may specify. Such use shall be in accordance with the legal and administrative provisions of the Contracting Party which seeks to use the information. The use of information for other purposes includes its use in criminal investigations, prosecutions or proceedings.

Article 25

Confidentiality and Protection of Information

1. Any information communicated under this Convention shall be treated as confidential and shall, at least, be subject to the same protection and confidentiality as the same kind of information is subject to under the national legal and administrative provisions of the Contracting Party where it is received.
2. Personal data exchange between two or more Contracting Parties under this Convention shall not begin until the Contracting Parties concerned have, by mutual arrangement in accordance with paragraph 2 of Article 48, decided that such data will be afforded, in the territory of the receiving Contracting Party, a level of protection that satisfies the requirements of the national law of the supplying Contracting Party.
3. In the absence of a mutual arrangement as referred to in paragraph 2 of this Article, personal data may only be supplied when the supplying Contracting Party is satisfied that such personal data will be protected in the territory of the receiving Contracting Party in accordance with the provisions of this Convention.
4. Contracting Parties shall, at the time of signature, ratification of or accession to this Convention, inform the Secretary General in writing of their national legal and administrative provisions in respect of confidentiality of information and protection of personal data. They shall make a written declaration to the Secretary General, at the time of signature, ratification of or accession, of their commitment to, at least, abide by the confidentiality of information and data protection provisions of this Convention.

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Article 26

Personal Data Protection

1. Personal data shall only be supplied to a Customs administration. The supply of personal data to any other authority shall only be allowed after prior approval by the Customs administration supplying the data concerned.
2. On request, the Customs administration receiving personal data shall inform the Customs administration which supplied that data of the use made of it and the results achieved.
3. Personal data supplied under this Convention shall be kept only for the time necessary to achieve the purpose for which it was supplied.
4. The Customs administration supplying personal data shall, to the extent possible, ensure that this data has been collected fairly and lawfully and that it is accurate and up to date and not excessive in relation to the purposes for which it is supplied.
5. If personal data supplied is found to be incorrect or should not have been exchanged, this shall be notified immediately. The Customs administration that has received such data shall amend or delete it.
6. The Customs administrations shall record the supply or receipt of personal data exchanged under this Convention.

7. The Customs administrations shall take the necessary security measures to protect personal data exchanged under this Convention from unauthorized access, amendment or dissemination.

8. A Contracting Party shall be liable, in accordance with its legal and administrative provisions, for damage caused to a person through the use of personal data exchanged under this Convention. This shall also be the case where the damage was caused by a Contracting Party supplying inaccurate data or supplying data that is contrary to this Convention.

9. If the Contracting Party found liable for damage under paragraph 8 of this Article is not the Contracting Party that supplied the personal data, the Contracting Parties concerned shall agree on the terms and conditions of reimbursement to the liable Contracting Party of any sums it paid out in compensation.

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CHAPTER VIII

Centralization of Information

Article 27

Purpose of Centralization

1. The information referred to in Articles 28, 29 and 30 shall be placed in a secure central automated information system for the purpose of risk assessment to ensure the proper application of Customs law, to prevent, investigate and combat Customs offences and to ensure the security of the international trade supply chain.

2. Personal data shall also be placed in a secure central automated information system for the purpose of providing information on persons known to have committed a Customs offence or suspected of being about to commit a Customs offence.

Article 28

Non-Personal Information

1. For the purposes of Articles 27 and 31 and if permissible under their national laws, Customs administrations shall communicate to the central automated information system the following non-personal information:

- i. case reference information, where appropriate;
- ii. commodities;
- iii. quantities and unit of measurement;
- iv. means of transport;
- v. means of concealment;
- vi. indication whether commodities are detected at importation, exportation, in transit or inland;
- vii. routing;
- viii. means of detection.

2. The Administrative Committee shall have the authority to modify the list in paragraph 1 of this Article.

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Article 29

Information on Natural and Legal Persons

1. For the purposes of Articles 27 and 31 and if permissible under their national laws, Customs administrations may communicate to the central automated information system the following information:

(A) On natural persons :

- i. family name, maiden name, given names and aliases, and former names, as appropriate;
- ii. date and place of birth;
- iii. nationality;
- iv. type and number of identity paper(s);
- v. sex;
- vi. country of residence;

- vii. nature of offence;
- viii. occupation;
- ix. distinguishing features;
- x. prior history or information on suspects;
- xi. registration numbers of the means of transport;
- xii. indicators of level of danger that a person may pose;
- xiii. specific reason for inclusion of data;
- xiv. criminal organization belonged to;
- xv. known associates.

(B) On legal persons :

- i. name, trade name;
 - ii. country of registration;
 - iii. registration number;
 - iv. date of registration;
 - v. registered office;
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- vi. trading address;
 - vii. nature of business;
 - viii. nature of offence;
 - ix. prior history or information on suspected legal persons;
 - x. specific reason for inclusion of data;
 - xi. names of principal officers or employees and, if appropriate, any other identifying information as indicated under paragraphs (A) i to xv.

2. The Administrative Committee shall have the authority to modify the lists in paragraphs 1 (A) and (B) of this Article.

Article 30

Other Information

Customs administrations may communicate to the central automated information system, if permissible under their national laws, any other information that may be relevant for the proper application of Customs law, for the prevention, investigation and combating of Customs offences, and for ensuring the security of the international trade supply chain.

Article 31

Central Automated Information System

1. The information referred to in Articles 28, 29 and 30 shall be placed in a secure central automated information system for Customs purposes. This system shall be managed from the Headquarters of the Council and be accessible under the provisions laid down in Article 38.

2. The communication of information by a Contracting Party to the central automated information system shall be subject to that Contracting Party's legal and administrative provisions, unless this Convention lays down more stringent provisions.

3. Each Contracting Party shall designate a competent authority in its Customs administration to be responsible at the national level for the correct operation of the central automated information system and for the measures necessary to ensure compliance with the provisions of Chapters VIII and X.

4. The Secretary General shall designate Council officers to be responsible at the Council level for the correct operation and maintenance of the central automated information system and for the measures necessary to ensure compliance with the provisions of Chapters VIII and X.

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5. Each Contracting Party shall notify the Secretary General of the competent authority it has designated under paragraph 3 of this Article, who shall make this information available to the other Contracting Parties, along with any relevant information regarding Council officers designated under paragraph 4 of this Article. The information referred to in this paragraph

shall be included in the central automated information system, but not be subject to the provisions of Chapter VII.

Article 32

Management of the Central Automated Information System

1. A team shall be set up to manage the central automated information system with regard to technical, operational and procedural matters. It shall consist of representatives from the Customs administrations of the Contracting Parties and Council officers. The composition of the Management Team shall be decided by the Administrative Committee.

2. The Management Team shall establish procedures for all technical and operational matters including procedures relating to :

(a) communication of information, in accordance with Articles 28, 29 and 30;

(b) access to the central automated information system and to the information it contains, in accordance with Article 38; and

(c) modification of information, in accordance with the provisions of Articles 39 and 40.

3. Following the approval by the Administrative Committee of the procedures referred to in paragraph 2 of this Article, the Management Team shall ensure their implementation.

4. The Management Team shall report at least annually to the Administrative Committee on the management of the central automated information system under paragraphs 1, 2 and 3 of this Article, making recommendations as necessary.

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CHAPTER IX

Security of the Central Automated Information System

Article 33

Responsibility for Security Measures

1. The Contracting Parties and the Secretary General shall be responsible for the implementation of all necessary measures for the security of the central automated information system. The objectives of these measures shall include, but not be limited to:

(a) preventing unauthorized access to equipment used for the processing of information in the system;

(b) preventing unauthorized access to the system;

(c) preventing unauthorized entry, reading, copying, amending or deletion of any information in the system;

(d) ensuring that it is possible to check and establish which designated competent authorities and Council officers, referred to in paragraph 1 of Article 38, have access to the central automated information system, and which designated officials and Council officers, referred to in paragraph 2 of Article 38, have access to the information in the system;

(e) ensuring that it is possible to check and establish which information has been introduced into the system, by whom, and to monitor queries;

(f) preventing the unauthorized reading, copying, amendment or deletion of information during the communication of data and the transport of data media.

2. The independent representative or representatives appointed under paragraph 1 (f) of Article 45 shall carry out verifications of access to and queries about personal data to ensure that access and queries made were admissible and were made by authorized users. A record of all verifications shall be maintained in the system for reporting to the Administrative Committee and deleted after twelve months.

Article 34

Implementation of Security Measures

1. Each Contracting Party shall designate a competent authority in its Customs administration to implement, at the national level, the security measures referred to in paragraph 1 of Article 33.

2. The Secretary General shall designate Council officers to implement, at the Council level, the security measures referred to in paragraph 1 of Article 33.

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3. Each Contracting Party shall notify the Secretary General of the competent authority it has designated under paragraph 1 of this Article, who shall make this information available to the other Contracting Parties, along with any relevant information regarding designated Council officers under paragraph 2 of this Article. The information referred to in this paragraph shall be included in the central automated information system, but not be subject to the provisions of Chapter VII.

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CHAPTER X

Protection of Information in the Central Automated Information System

Article 35

Inclusion of Information

The inclusion of information in the central automated information system shall be governed by the legal and administrative provisions of the supplying Contracting Party unless this Convention lays down more stringent provisions.

Article 36

Use of Information

1. The use of information obtained from the central automated information system shall be governed by the legal and administrative provisions of the Contracting Party using such information, unless this Convention lays down more stringent provisions.

2. Contracting Parties may only use information obtained from the central automated information system in order to achieve the purposes stated in Article 27. However, on request, the Contracting Party that supplied the information may authorize its use for other purposes, subject to any terms and conditions it may specify. Such other use shall be in accordance with the legal and administrative provisions of the Contracting Party which seeks to use the information. The use of information for other purposes includes its use in criminal investigations, prosecutions or proceedings.

3. Under the responsibility of the Secretary General, Council officers may use information obtained from the central automated information system only to carry out tasks as required under this Convention, subject to any conditions the Administrative Committee may impose.

4. Personal data may only be used if obtained from the central automated information system in accordance with paragraph 7 of Article 38.

Article 37

Retention of Personal Data

1. Personal data included in the central automated information system shall be kept only for the time necessary to achieve the purpose for which it was supplied. Contracting Parties shall specify the period of retention in the system of any personal data they supply.

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2. A supplying Contracting Party may extend the period of retention referred to in paragraph 1 of this Article if the retention of its personal data is necessary for the purposes for which it was supplied. If there is no extension of this period, the data shall be deleted from the central automated information system at the initiation of the Contracting Party that supplied the personal data.

3. The Secretary General shall inform the supplying Contracting Party of the imminent deletion of personal data under paragraph 2 of this Article, giving one month's notice.

4. The independent representative or representatives appointed under paragraph 1 (f) of Article 45 shall carry out verifications to ensure that the period of retention of personal data in the central automated information system is being complied with. A record of all verifications shall be maintained in the system for reporting to the Administrative Committee and deleted after twelve months.

Article 38

Access

1. The competent authorities and Council officers designated in accordance with paragraphs 3 and 4 of Article 31 shall have access to the central automated information system.

2. For the purposes of Article 27 and without prejudice to paragraph 7 of this Article, Contracting Parties shall designate officials in their Customs administrations, and the Secretary General shall designate Council officers, who shall have access to information in the central automated information system.
3. Access to the system shall be in accordance with the procedures referred to in paragraph 2 of Article 32. For the purpose of applying Article 32, the Management Team shall have access to the central automated information system.
4. The Administrative Committee may permit access to the non-personal information in the central automated information system by international and regional governmental organizations on the basis of reciprocity and subject to any conditions the Administrative Committee may specify.
5. The representative or representatives appointed by the Administrative Committee under paragraph 1 (f) of Article 45 shall have access to the central automated information system.
6. Each Contracting Party shall notify the Secretary General of the officials it has designated under paragraph 2 of this Article. The Secretary General shall make this information available to all Contracting Parties along with any relevant information regarding Council officers designated under the same paragraph. The information referred to in this paragraph shall be included in the central automated information system, but not be subject to the provisions of Chapter VII.
7. Contracting Parties may stipulate who shall have access, or who shall not have access, to the personal data they supply.

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8. The rights of natural persons with regard to personal data in the central automated information system, in particular their right of access, shall be put into effect in accordance with the legal and administrative provisions of the Contracting Party in whose territory such rights are invoked.

Article 39

Modification of Non-Personal Information in the Central Automated Information System

1. Non-personal information in the central automated information system shall only be amended, supplemented, corrected or deleted at the initiation of the supplying Contracting Party.
2. Non-personal information shall be amended, supplemented, corrected or deleted in accordance with the procedures established and implemented by the Management Team under paragraphs 2 and 3 of Article 32.

Article 40

Modification of Personal Data in the Central Automated Information System

1. Personal data in the central automated information system shall only be amended, supplemented, corrected, or deleted at the initiation of the supplying Contracting Party.

2. If a Contracting Party notes that the personal data it supplied is inaccurate, or was included or is stored in the central automated information system contrary to this Convention, it shall arrange for the amendment, supplementation, correction or deletion of this personal data without delay. The Contracting Party concerned shall arrange with the Secretary General to notify those who have been stipulated to have access to personal data, as referred to in paragraph 7 of Article 38, of such amendment, supplementation, correction or deletion.
3. If a Contracting Party has information to suggest that any personal data is inaccurate, or was included or is stored in the central automated information system contrary to this Convention, it shall advise the supplying Contracting Party as soon as possible. The latter shall check the data concerned and, if necessary, arrange for its amendment, supplementation, correction or deletion without delay. The supplying Contracting Party shall arrange with the Secretary General to notify those who have been stipulated to have access to personal data, as referred to in paragraph 7 of Article 38, of such amendment, supplementation, correction or deletion.

4. If, at the time of including personal data in the central automated information system, a Contracting Party realizes that its personal data conflicts with personal data supplied by another Contracting Party, it shall immediately advise the Contracting Party which supplied that data. The Contracting Parties concerned shall attempt to resolve the

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matter. If resolving the matter results in an amendment, supplementation, correction or deletion of personal data, the Contracting Party which had supplied the data shall arrange with the Secretary General to notify those who have been stipulated to have access to personal data, as referred to in paragraph 7 of Article 38, of such amendment, supplementation, correction or deletion.

5. Where a court or other competent authority within the territory of any Contracting Party makes a final decision regarding the amendment, supplementation, correction or deletion of personal data in the central automated information system, the Contracting Party in whose territory the decision is made shall arrange, if it supplied the data, for the amendment, supplementation, correction or deletion of this data without delay, or, if the data was supplied by another Contracting Party, it shall advise the supplying Contracting Party of the decision. The supplying Contracting Party shall then arrange for the amendment, supplementation, correction or deletion of the data without delay.

Article 41

Responsibilities and Liabilities

1. A Contracting Party shall be responsible, to the extent possible, for the accuracy, currency and lawfulness of the information it has included in the central automated information system.

2. A Contracting Party shall be liable, in accordance with its legal and administrative provisions, for damage caused to a person through the use of information obtained from the central automated information system by that Contracting Party. This shall also be the case where the damage was caused by the supplying Contracting Party entering inaccurate data or entering data that is contrary to this Convention.

3. If the Contracting Party found liable for damage under paragraph 2 of this Article is not the Contracting Party that supplied the information, the Contracting Parties concerned shall agree on the terms and conditions of reimbursement to the liable Contracting Party of any sums it paid out in compensation.

4. A Contracting Party shall be liable, in accordance with its legal and administrative provisions, for damage caused to a person through the use of information by Council officers obtained from the central automated information system contrary to this Convention, to the extent that this information had been included in the system by that Contracting Party.

5. If damage is established by a competent judicial authority with respect to paragraph 4 of this Article, the Contracting Party concerned may refer the decision to the Administrative Committee who will make a recommendation to the Council regarding any reimbursement.

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CHAPTER XI

Exemptions and Reservations

Article 42

Exemptions

1. Where any assistance requested under this Convention may infringe the sovereignty, laws and treaty obligations, security, public policy or any other substantive national interest of a requested Contracting Party, or prejudice any legitimate commercial or professional interests, such assistance may be declined by that Contracting Party or provided subject to any terms or conditions it may require.

2. Where a requesting administration would be unable to comply if a similar request were made by the requested administration, it shall draw attention to that fact in its request.

Compliance with such a request shall be at the discretion of the requested administration.

3. Assistance may be postponed if there are grounds to believe that it will interfere with any ongoing investigation, prosecution or proceeding. In such a case, the requested

administration shall consult with the requesting administration to determine if assistance can be given subject to such terms or conditions as the requested administration may specify.

4. If the requested administration considers that the effort required to fulfill a request is clearly disproportionate to the perceived benefit to the requesting administration, it may decline to provide the requested assistance.

5. Where assistance is declined or postponed, reasons for declining or postponement shall be given.

Article 43

Reservations

1. Articles 9, 10, 12, 14, 15, 16, 17, 19, 20, 21, 22, 23, 29 and 30 may, in whole or in part, be subject to reservations.

2. A Contracting Party shall be deemed to have accepted all provisions in Articles 9, 10, 12, 14, 15, 16, 17, 19, 20, 21, 22, 23, 29 and 30 unless at the time of signature, ratification of, or accession to the Convention, it has notified the Secretary General of any reservations referring to these provisions.

3. A Contracting Party that has entered reservations may withdraw them, in whole or in part, at any time by notification to the depositary specifying the date on which such withdrawal takes effect.

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CHAPTER XII

Costs

Article 44

1. Subject to paragraphs 2 and 3 of this Article, the costs incurred in the application of this Convention shall be borne by the requested Contracting Party.

2. Expenses and allowances paid to experts and witnesses, as well as costs of translators and interpreters, other than Government employees, shall be borne by the requesting Contracting Party.

3. If the execution of a request requires expenses of a substantial or extraordinary nature, the Contracting Parties shall consult to determine the terms and conditions under which the request will be executed as well as the manner in which the costs shall be borne.

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CHAPTER XIII

Final Provisions

Article 45

Management of the Convention

1. An Administrative Committee shall be established to :

(a) consider issues relating to the implementation and administration of this Convention, and any amendments proposed thereto;

(b) recommend to Contracting Parties amendments to this Convention;

(c) recommend to Contracting Parties measures to secure the uniform interpretation and application of this Convention;

(d) decide the composition of the Management Team referred to in paragraph 1 of Article 32;

(e) examine and approve the technical and operational procedures referred to in paragraph 2 of Article 32 relating to the central automated information system;

(f) appoint one or more independent representatives to carry out the verifications referred to in paragraph 2 of Article 33 and paragraph 4 of Article 37 and determine the scope, frequency and other terms and conditions for such verifications;

(g) determine the conditions referred to in paragraph 3 of Article 36 relating to the use by Council officers of information obtained from the central automated information system;

(h) determine the conditions referred to in paragraph 4 of Article 38 relating to permitting access to non-personal information in the central automated information system by international and regional governmental organizations;

(i) make recommendations to the Council regarding reimbursement under paragraph 5 of Article 41;

- (j) maintain relations with other international organizations concerned;
- (k) consider any other issues of relevance to this Convention that may be referred to it;
- (l) inform the Enforcement Committee and the Council of its decisions.

2. The Administrative Committee shall take decisions regarding the modification of the lists in Articles 10, 28 and 29, as required, without recourse to Article 49 and regarding implementation of these decisions.

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3. All Contracting Parties to this Convention shall be members of the Administrative Committee.

4. Any entity qualified to become a Contracting Party to this Convention under the provisions of Article 46 may be invited to attend the sessions of the Administrative Committee as an observer. The status and rights of such observers shall be determined by the Administrative Committee. The Administrative Committee may invite the representatives of international organizations to attend its sessions as observers.

5. The Administrative Committee shall establish its own rules of procedure by a majority of not less than two-thirds of the Contracting Parties to this Convention. In the absence of rules of procedure of the Administrative Committee at the time of the entry into force of this Convention, the rules of procedure of the Council shall be applicable until the Administrative Committee adopts its own rules.

6. Without prejudice to paragraph 5 of this Article, matters related to this Convention before the Administrative Committee shall be decided by consensus of those present.

Where a decision cannot be arrived at by consensus, the matter shall be decided by a simple majority vote of those present. In any case, for the purpose of modifying the lists in paragraph 2 of Article 10, paragraph 1 of Article 28, paragraph 1 of Article 29, as well as for the purpose of appointing one or more representatives under paragraph 1(f) of this Article, the decision shall be taken by a majority of not less than two-thirds of the Contracting Parties present and entitled to vote. In the case of permitting access to non-personal information referred to in paragraph 4 of Article 38, the decision shall be taken by unanimous vote of those present.

7. Each Contracting Party shall be entitled to one vote. Where paragraphs 3 and 4 of Article 46 apply, the Customs or Economic Unions which are Contracting Parties shall have, in the case of voting, only a number of votes equal to the total votes allocated to their Members which are Contracting Parties.

8. The Administrative Committee shall meet at least once each year. It shall annually elect a Chairperson and a Vice-Chairperson. The Customs administrations of the Contracting Parties shall communicate to the Secretary General any requests for the inclusion of items on the Agenda of the sessions of the Administrative Committee. The Secretary General shall circulate the invitation and the draft Agenda to the Customs administrations of the Contracting Parties and to the observers referred to in paragraph 4 of this Article at least six weeks before the Administrative Committee meets.

9. The Council shall provide the Administrative Committee with secretariat services.

Article 46

Signature, Ratification and Accession

1. Any Member of the Council and any Member of the United Nations or its specialized agencies may become a Contracting Party to this Convention:

- (a) by signing it without reservation of ratification;

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- (b) by depositing an instrument of ratification after signing it subject to ratification; or

- (c) by acceding to it.

2. This Convention shall be open until 28 June 2004 for signature at the Headquarters of the Council in Brussels by the Members referred to in paragraph 1 of this Article.

Thereafter, it shall be open for accession by such Members.

3. Any Customs or Economic Union may become a Contracting Party to this Convention in accordance with paragraphs 1 and 2 of this Article. Such Customs or Economic Union shall

inform the Secretary General of the Members forming the Union, as well as of its competence with respect to the matters governed by this Convention. Such Customs or Economic Union shall also inform the Secretary General of any substantial modification in the extent of its competence.

4. A Customs or Economic Union which is a Contracting Party to this Convention shall, for the matters within its competence, exercise in its own name the rights, and fulfil the responsibilities, which the Convention confers on the Members of such a Union which are Contracting Parties to this Convention. In such a case, the Members of such a Union shall not be entitled to individually exercise these rights, including the right to vote.

5. Any Contracting Party which ratifies this Convention or accedes thereto shall be bound by any amendments to this Convention which have entered into force at the date of deposit of its instrument of ratification or accession.

Article 47

Territorial Application of the Convention

1. Any Contracting Party may at any time declare by notification given to the depositary that this Convention shall extend to all or any of its territories for whose international relations it is responsible. Such notifications shall take effect three months after the date of the receipt thereof by the depositary. However, this Convention shall not apply to any territories named in the notification before this Convention has entered into force for the Contracting Party concerned.

2. Any Contracting Party which has made notification under paragraph 1 of this Article extending this Convention to any territory for whose international relations it is responsible may notify the depositary, under the procedure of Article 52 of this Convention, that the territory in question will no longer apply this Convention.

Article 48

Implementation and Application of the Convention

1. In applying this Convention, Contracting Parties shall take the necessary measures to ensure, to the extent possible, that their officials who are responsible for investigating or combating Customs offences maintain personal and direct relations with each other.

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2. Two or more Contracting Parties may decide on the mutual arrangements to facilitate the implementation and application of this Convention between them.

Article 49

Amendments to the Convention

1. The text of any amendment recommended to the Contracting Parties by the Administrative Committee in accordance with paragraph 1(b) of Article 45, shall be communicated by the Secretary General to all Contracting Parties and to those Members of the Council that are not Contracting Parties.

2. Any proposed amendment to this Convention shall enter into force three months after the expiry of a period of twenty four months from the date of communication of the proposed amendment in accordance with paragraph 1 of this Article, provided that no objection to the proposed amendment has been communicated by a Contracting Party to the Secretary General during this period.

3. If an objection to the proposed amendment has been lodged by a Contracting Party before the expiry of the period of twenty four months specified in paragraph 2 of this Article, the amendment shall be deemed not to have been accepted.

Article 50

Settlement of Disputes

1. Without prejudice to paragraph 1 (c) of Article 45, any dispute between two or more Customs administrations concerning the interpretation or application of this Convention shall so far as possible be settled by negotiation between them.

2. Any dispute that is not settled by negotiation shall be referred by the Contracting Parties to the Administrative Committee which shall thereupon consider the dispute and make recommendations for its settlement.

3. The Contracting Parties in dispute may agree in advance to accept the recommendations of the Administrative Committee as binding.

4. Disputes for which no solutions are found shall be settled by diplomatic means.

Article 51

Entry into Force

1. This Convention shall enter into force three months after five of the entities referred to in paragraphs 1 and 3 of Article 46 thereof have signed the Convention without reservation of ratification or have deposited their instrument of ratification or accession.

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2. After entry into force in accordance with paragraph 1 of this Article, this Convention shall enter into force for any other Contracting Party three months after it has become a Contracting Party in accordance with the provisions of Article 46.

Article 52

Denunciation

1. This Convention is of unlimited duration but any Contracting Party may denounce it at any time after the date of its entry into force under Article 51 thereof.

2. The denunciation shall be notified in writing, deposited with the depositary.

3. The denunciation shall take effect six months after the receipt of the instrument of denunciation by the depositary.

Article 53

Depositary of the Convention

1. This Convention, all signatures with or without reservation of ratification and all instruments of ratification or accession shall be deposited with the Secretary General.

2. The depositary shall :

(a) receive and keep custody of the original texts of this Convention;

(b) prepare certified copies of the original texts of this Convention and transmit them to the Contracting Parties and those Members of the Council which are not Contracting Parties and to the Secretary General of the United Nations;

(c) receive any signature with or without reservation of ratification, ratification or accession to this Convention and receive and keep custody of any instruments, notifications and communication relating to it;

(d) receive and keep custody of national legal and administrative provisions and written declarations in respect of paragraph 4 of Article 25;

(e) receive and keep custody of any notifications of reservations by Contracting Parties in accordance with Article 43;

(f) examine whether the signature or any instrument, notification or communication related to this Convention is in due and proper form and, if need be, bring the matter to the attention of the Contracting Party in question;

(g) notify the Contracting Parties, those Members of the Council that are not Contracting Parties, and the Secretary General of the United Nations of :

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- the date of entry into force of this Convention in accordance with Article 51 of this Convention;

- notifications received in accordance with Articles 43, 46, 47 and 51 of this Convention;

- denunciations under Article 52 of this Convention;

- any amendments accepted or objected to in accordance with Article 49 of this Convention and the date of their entry into force; and

- any decisions taken by the Administrative Committee referred to under paragraph 2 of Article 45;

(h) notify the Contracting Parties of the authorities referred to in paragraph 3 of Article 2;

(i) notify the Customs administrations of the official contact points referred to in paragraph 1 of Article 3.

3. In the event of any difference appearing between a Contracting Party and the depositary as to the performance of the latter's function, the depositary or that Contracting Party shall

bring the question to the attention of the other Contracting Parties and to the signatories or, as the case may be, the Administrative Committee.

Article 54

Registration and Authentic Texts

In accordance with Article 102 of the Charter of the United Nations, this Convention shall be registered with the Secretariat of the United Nations at the request of the Secretary General. In witness hereof the undersigned, being duly authorized thereto, have signed this Convention.

Done at Brussels, this twenty-seventh day of June two thousand and three in the English and French languages, both texts being equally authentic, in a single original which shall be deposited with the Secretary General who shall transmit certified copies to all the entities referred to in paragraphs 1 and 3 of Article 46 of this Convention.

Annex 8.5

**Agreement between the
Government of Romania and
the Government of the
Republic of Hungary regarding
the unfolding of the railway
traffic through the state border**

AGREEMENT
From 12/03/1997

Published in the Official Monitor, Part I, no.109 from 10/03/1998
Between the Government of Romania and the Government of the Republic of Hungary regarding the unfolding of the railway traffic realized through the state border

The Government of Romania and the Government of the Republic of Hungary, denominated, in the following, contracting sides, willing to keep the favorable relations, relations of good neighboring between the two states, striving to regulate and develop the railway traffic between states, taking into consideration the international agreements to which both contracting sides are part of, taking into account the Wien Convention which regards the treaties' right, signed on the 23rd of May of 1969, agreed on the following:

ARTICLE 1
Introductive Dispositions

1. For border crossing railway routes the following railway lines are available:
 - Carei – Agerdomajor
 - Valea lui Mihai – Nyirabrany
 - Episcopia Bihor – Biharkeresztes
 - Salonta – Kotegyan
 - Curtici – Lokoshaza
2. For the border crossing railway routes presented at paragraph 1, the border stations are the following:
 - a. Carei
 - Valea lui Mihai
 - Episcopia Bihor
 - Salonta
 - Curtici
 - Agerdomajor
 - Nyirabrany
 - Biharkeresztes
 - Lokoshaza
 - b. common station: Curtici
3. The railways of the contracting sides agree on common consent on the transmission stations.
4. On the basis of the approval of the competent bodies of the contracting sides, the railways agree on the traffic type which unfolds at each border

- crossing (of passenger, of traveling luggage, of parcels, of goods and postal forwarding).
5. The control regulations of the border traffic, including the service of assuring the order and the guard of the trains that cross the border, are included in distinctive bilateral agreements between the two states.
 6. The railway connection and exchange service unfolds in the common station, respectively in the transmission stations.

ARTICLE 2 Definitions

The notions from the present agreement have the following definitions:

1. the term of domicile state means the state of the contracting side on whose territory the transmission station is;
2. the term of neighboring state means the state of the other contracting side;
3. the term of railway defines, for Romania, The National Society of the Romanian Railways – Societatea Nationala a Cailor Ferate (S.N.C.F.R.) and, respectively, for the Republic of Hungary, The Hungarian Railways Unltd. (MAV Rt);
4. the term of domicile railways refers to the railways of the domicile state;
5. the term of neighboring railways means the railways of the other contracting side;
6. the term of connection and exchange service refers to the activity of circulation, commercial and technical, necessary for the traffic on the railway line that crosses the border;
7. the term of control service of the traffic that crosses the border means the control activity of the competent bodies of the contracting sides, as regards the frontier guard's, customs, phyto-sanitary, veterinary and, if necessary, epidemiological control, at border, of the persons, goods and transportation means, depending on the situation;
8. the term of border station means, generally, the nearest railway station to the state border;
9. the term of transmission station means that railway station in which the services of connection and exchange are carried out;
10. the term of common station refers to the transmission stations, in which the two railways carry out the connection and exchange service, and the competent bodies of the contracting sides carry out together the control service of the traffic that crosses the border;
11. the term of the railway that crosses the border means the railway portion between the transmission station of the domicile railway and the border station of the neighboring railway;

12. the term of railway section that crosses the border means the railway portion between the state border and the border station;
13. the term of competent bodies refers to those bodies of the contracting sides that are charged with the fulfillment of the tasks that concern the border railway traffic, tasks that result from the present agreement.

ARTICLE 3

The Competent Authority

For the applying in practice of the present agreement the competent authority is responsible, that is:

- for Romania – The Ministry of Transportation;
- for the republic of Hungary – The Ministry of Transportation, Communication and Waters

ARTICLE 4

The Service of Assuring the Order

In the transmission stations, border stations, common stations, as well as on the railway that crosses the border, the service of assuring the order is carried out on the basis of the internal regulations by the competent bodies of the state on whose territory the station is, respectively the railway sections that cross the border.

ARTICLE 5

The Working Language

1. The oral and written communication between the staff of the competent bodies, which carry out the working tasks in the transmission station, is achieved in the official language of the domicile state. The staff of the competent bodies, which carry out working tasks in the stations and on the trains that are on the territory of the other contracting side, are obliged to know the language of the respective state, at the necessary level that would be needed for the adequate carrying out of the tasks.
2. Any written or oral communication between the railways of the two sides is achieved on the basis of the conventions between the railways.
3. Those dispositions and working forms that the railways exchange should not be accompanied by translations.
4. The reports signed by the staff of the competent bodies should be written in two original copies, in Hungarian and Romanian languages.

ARTICLE 6

The Over Passing of the Impediments in the Railway Circulation

1. The railways shall inform mutually, according to the valid international agreements to which the both contracting sides are part of, about all the impediments that could produce perturbations in the railway connections between the states of the contracting sides or in the railway traffic of the neighboring state.
2. The over passing of the impediments that appear in the border station, respectively on the railway that crosses the border, constitutes the obligation of that contracting side on whose territory the impediment appeared. The other railway offers its help, at the interested railway's request, especially by putting at disposal the installations, vehicles, and the material means, respectively the necessary labor force. The help granting is in exchange for a payment, the payment being established between the railways.

ARTICLE 7 Working Spaces

1. To the competent bodies from the neighboring state must be assured in the common station, respectively in the transmission stations, adequate rooms and spaces for the normal unfolding of the working activity. The rooms shall be equipped with panels written in the official languages of the contracting sides, the text written in the official language of the domicile state being the first.
2. The competent bodies of the neighboring state have the right to mark these rooms with its own state emblem and flag.

ARTICLE 8 The Detaching of the Staff of the Competent Bodies

1. For carrying out the tasks that result from the present agreement, the competent bodies of the contracting sides may detach staff in the common station, and the railways may detach staff in the transmission stations, too.
2. For carrying out the tasks that result from the present agreement, the neighboring railways may name representatives, on their own expense, in the common station and in the transmission stations.

The details concerning the working space and the activity of the representatives are established on common consent by the railways, by ulterior regulations.

ARTICLE 9

The Judicial Status of the Staff of the Competent Bodies on the Territory of the Neighboring State

1. The staff of the competent bodies, which carry out the working tasks on the territory of the neighboring state, on the basis of the present agreement, are obliged to respect the laws of the respective state, being, at the same time, the beneficiary of their protection.
2. The working relations of the staff of the competent bodies on the territory of the neighboring state are under the laws and other stipulations of their own country. For the working infringements produced on the territory of the neighboring state, the staff is exclusively responsible in front of their own superior bodies.
3. At the request of the competent bodies of the other contracting side, they are obliged to call back the staff that carry out working tasks on the territory of the neighboring state. The request for calling back must be motivated.

ARTICLE 10

Help and Protection Granting

1. The competent bodies of the contracting sides assure mutually the well unfolding of the working tasks and, if necessary, grant help and protection.
2. The staff of the competent bodies, which on the basis of the present agreement, are on the territory of the state of the other contracting side for the carrying out of the working tasks, as well as the family members that live with them, benefit from the medical assistance from the domicile state, according to the valid agreement between the contracting sides.

ARTICLE 11

The Free of Charge Journey

With the occasion of the fulfillment of the working tasks, the staff of the competent bodies, those detached on a long term and their family members may travel free of charge on the railway lines presented at the art.1, paragraph 1 of the present agreement.

ARTICLE 12

The Wearing of the Uniform

On the basis of the present agreement, the staff that carries out the working tasks on the territory of the neighboring state has the right, during the working hours, to wear the uniform and the working tokens.

ARTICLE 13

The Construction, the Maintenance and the Supervising of the Railway Constructions and Installations

1. The construction, supervising, maintenance and reconstruction of the railway buildings and installations, in the border stations and on the border crossing railways, shall be carried out by the railway of the domicile state, on its own expense.
2. The maintenance and reconstruction of the railway buildings and installations, that are on the state border, as well as their supervising is regulated with the consent of the competent bodies of the contracting sides, by the railways, by an ulterior common agreement.

ARTICLE 14

General Dispositions Concerning the Connection and Exchange Service

1. The railways regulate commonly the assurance of the connection and exchange service in the common station and in the transmission stations.
2. The unfolding of the international railway traffic on the railway that crosses the border until the transmission station or the common station is carried out by the railway of the neighboring state with own train and locomotive staff, according to own stipulations. The railways may agree on some other modalities.
3. The railways may agree that the trains should benefit from the services of the staff of the neighboring railway and from the rolling stock even beyond the border station.
4. In the transmission station and in the common station the railway stipulations of the domicile railway must be applied. Nevertheless, the railways may agree on the usage of the regulations of the neighboring railway for the activities that do not affect the circulation security.

ARTICLE 15

The Train Timetable

With the occasion of the drawing up of the timetable of the trains that cross the state border, a parking time shall be assured, in the transmission station or in the

border station, time that would permit the safe and fast unfolding of the working tasks, taking into consideration the international practice in the domain.

ARTICLE 16

The Delivering and Taking Over of the Railway Cars and of the Goods

The delivering and taking over of the freight and passenger cars, of the palettes, loading devices, as well as of the cargo and of the transportation documents must be carried out according to the international agreements to which both contracting sides or railways are part of.

Article 17

Postal Forwarding

The delivery of the postal forwarding through the state border is carried out on the basis of the agreements and regulations from the Universal Convention of the Post Offices or on the basis of the agreements concluded by the postal bodies of the contracting sides.

ARTICLE 18

The Working Mail

The transmission of the railway working documents (telegrams, working forms, train timetables, tariff dispositions etc) is carried out on the basis of the international regulations that apply to both contracting sides and on the basis of the agreements concluded between the railways. The transmission is free of charge on the lines of the both railways.

ARTICLE 19

The Service of Telecommunication and Signalization, Centralization and Block

1. The construction and the maintenance of the telecommunication and security installations that assure the unfolding of the border traffic, as well as the other telecommunication installations that assure the connection between the railways are provided by the contracting sides on their own state territory, by their own railway. The competent bodies of the contracting sides may agree on this in a distinctive manner, too.
2. The maintenance and the reparation of the fixed signals, as well as of the afferent security and telecommunication installations that are on the territory of the neighboring state, are incumbent to the owning railway. The competent bodies of the contracting sides may agree on this in a distinctive manner, too.

3. The securing, installation and maintenance of the equipment of the railway data terminals for the preparation, processing, transmission and recording, as well as of the air conditioning devices, if necessary, are incumbent to the railway whose purposes are achieved within the terminal. The equipping with the necessary technique, for example phones, radiophones and their maintenance, is incumbent to the owning railway administration.
4. With the consent of the competent bodies the railways may agree on:
 - a. the realization of railway telecommunication connections, from the transmission station to the telecommunication network of the neighboring railway.
 - b. the realization of direct connections of railway telecommunications between the leading bodies of the railways.
5. The railway radio stations, installed in the transmission or border stations, shall function according to the valid laws of the state on whose territory they function and with the approval of the regulation bodies of the two states concerning the radio frequencies in the border zone.
6. For working interests, the employees of the competent bodies of the contracting sides may use free of charge the telecommunication installations of the neighboring railway. It is forbidden the usage of these installations in personal purpose. The connections realized according to the present article can not be linked to the public telecommunication network.

ARTICLE 20 State Border Crossing

The state border crossing by the employees of the competent bodies of the contracting sides for the carrying out of the working tasks that result from the stipulations of the present agreement shall be fulfilled according to the valid agreement.

ARTICLE 21 The Customs Control and Service

1. The customs operations and controls of the goods, parcels, and passengers transported on the railway shall be carried out by the customs bodies of the contracting sides, according to the internal customs stipulations of the respective state.
2. The competent bodies of one of the contracting sides shall accept any forwarding refused by the competent bodies of the other contracting side, if it is motivated in writing the cause of the refusal.

ARTICLE 22 Customs Facilitations

1. There are exempted of import customs duties, taxes and other charges:
 - a. the objects that serve the transportations, the means of special transportation, the installations, the necessary tools, the materials and spare parts motivated with documentation, that serve to the maintenance in functioning, to the reparation, maintenance and over passing of the impediments in the railway circulation;
 - b. The installations and the furniture of the working spaces;
 - c. The official documents that are necessary for the carrying out of the working tasks, the consumables, the working equipment of the employees and the personal objects, including the food that these bring on the territory of the neighboring state for the fulfillment of the working tasks;
 - d. The mobile goods of personal usage that belong to the employees or their family members, which work permanently on the territory of the other contracting side.
2. The objects listed at paragraph 1, subparagraphs a., b., and d. shall be written in a report drawn up in three copies, out of which one shall be transmitted to the customs bodies of the other contracting side. The objects listed at paragraph 1, subparagraphs a., b., and d. shall be transported from the territory of one of the neighboring states to the territory of the other state, temporarily, and obligatorily returned.
3. According to the stipulations of the present agreement, the employees that work on the territory of the neighboring state may cross to the territory of their own state without any other special approval, as well as without the payment of the customs duties, of the taxes or any other charges, payment means that result from the selling of tickets, transport tariffs, customs or other taxes and charges, the objects and goods retained during the working hours, as well as the samples taken in veterinary or phyto-sanitary protection purpose. The adequate proving documents shall be presented, depending on the case, to the competent bodies, with the occasion of leaving the territory of the neighboring state.

ARTICLE 23 Responsibilities

1. In the situation in which, during the connection and exchange service on the railway that crosses the border, in the common station, in the

- transmission or border stations, due to a special event in the functioning of the railway the decease or corporal damage of a passenger appears, respectively one of his/her objects is destroyed or damaged, the responsibilities towards the person entitled to compensations are incumbent to the railway on whose state territory the event that had caused the damage took place, according to the laws of that state.
2. When establishing the responsibilities, there shall be proceeded according to the stipulations of the paragraph 1 also in the situation in which, due to the same event, produced in the same place and in the same conditions, there is the decease or accident of another person that is not a passenger or a railway employee or an object that is not under the incidence of the transportation contracts is destroyed or damaged.
 3. If, due to an accident in the railway exploitation, produced during the carrying out of the connection and exchange service on the railway that crosses the border, in the transmission or border stations or with the occasion of the going to or from the working place, there is the decease or corporal damage of an employee belonging to the competent bodies of the other contacting side or an object worn or possessed by him/her is destroyed or damaged, the establishing of the quantum of the compensations from the judicial point of view shall be done as if the accident was on the territory of the neighboring state.
 4. As regards the responsibilities that result from the transportation contracts as consequence of the losses or damages of the means of transportation, of their parts or accessories, of the loading devices or of the palettes, the contracting sides shall apply the stipulations included in the international agreements and conventions to which both contracting sides or railways are part of.
 5. As consequence of the stipulations of the paragraphs 1 and 4, concerning the fees of the mutual claims there shall be proceeded as it follows:
 - a. the damages produced by the employees of the railway shall be supported by the railway whose employee produced the damage;
 - b. the damages produced due to a non corresponding state of the constructions, installations, and means of haulage that assure the unfolding of the railway circulation and its security, shall be supported by the railway to which is incumbent the task of their maintenance and reparation;
 - c. the responsibility for the damages produced due to the non corresponding technical state of another rolling stock is incumbent to the railway that carried out the last technical examination in the common station or in the transmission station;
 - d. if the damages are produced by both railways or employees of the both railways, the responsibility shall be proportional to the guilt of each of

- them, in the case in which it can not be established concretely which of the two sides and in what proportion is responsible for the damages, both railways shall support equally the consequences;
- e. the damages produced out of inevitable causes shall be supported by the affected railway.
 6. The investigation and establishing of the causes of the events, accidents or fires, in the situation in which it is supposed the responsibility of the other railway, shall be done by the representatives of both railways, according to the laws of the state on whose territory these have been produced.
 7. For the regulation of the situations in which a railway addresses to the other railway for compensations, the stipulations of the international agreements are applied, stipulations to which the both contracting sides and railways are part of.

ARTICLE 24

The Deduction of the Services

The payment and the deduction of the transportation and the railway services, respectively of the possible damages, are done on the basis of the agreements between the railways of the contracting sides.

ARTICLE 25

Epidemiological, Veterinary and Phyto-sanitary Verifications

The verification from the epidemiological, veterinary and phyto-sanitary point of view of the perishable goods and of the living beings that are forwarded on the railway over the state border is incumbent to the competent bodies of the contracting sides according to the internal valid laws and the international agreements to which the contracting sides are part of.

ARTICLE 26

The Joint Commission

1. For the applying and unfolding of the stipulations of the present agreement, the contracting sides shall form up a joint commission of border railway circulation, made up of the representatives of the competent bodies of the contracting sides.
2. The joint commission unfolds its meetings annually or any time that it is necessary, alternatively, on the territory of the both states.
3. The activity of the joint commission shall unfold according to the agenda that shall be established with the occasion of its first session.

ARTICLE 27 The Entry in Force

1. The present agreement shall entry in force at the date at which both sides shall have notified in writing, mutually, the fulfillment of the valid internal legal procedures concerning the approval and the ratification.
2. Any modification of the present agreement shall be consented on by the contracting sides and it shall entry in force according to the procedure mentioned at paragraph 1 of this article.

ARTICLE 28 The Validity of the Agreement

The present agreement is concluded for an undetermined period.
The validity of this agreement shall expire at 6 months after one of the contracting sides shall have notified, in writing, to the other contracting side the denunciation of this.

Signed at Budapest on the 12th of March of 1997, in two original copies, each of them in Romanian and Hungarian languages, both texts being equally authentic.

Annex 9.1

Pictures of intermodal terminals

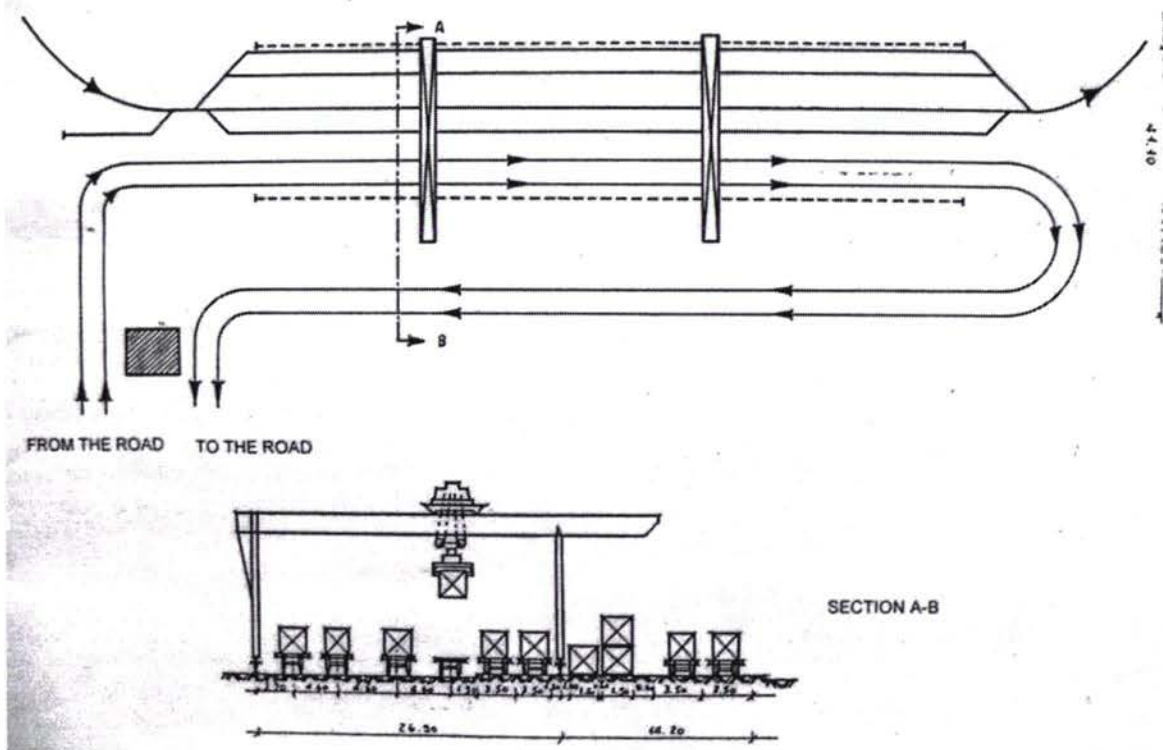


Figure 1 – Scheme of a big intermodal terminal

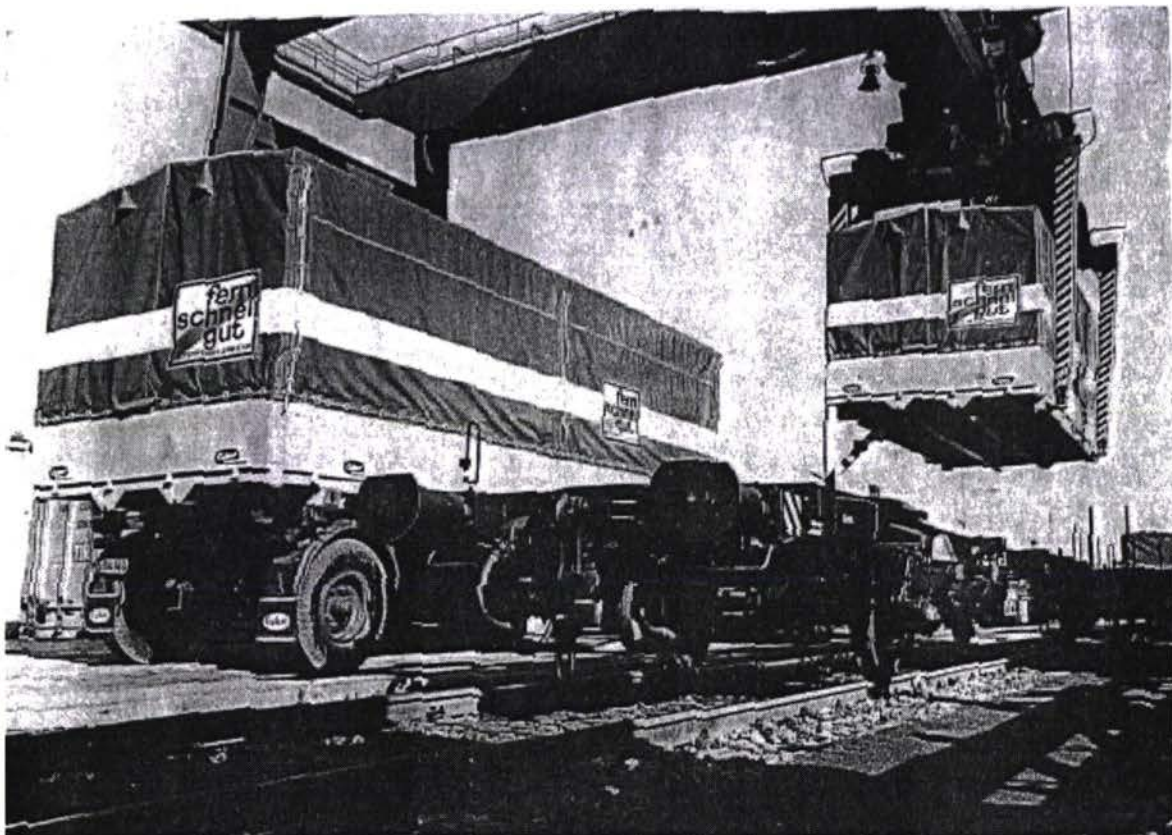


Figure 2 – Gantry crane lifting a swap body



Figure 3 – A container handling front lift at work



Figure 4 – Dushanbe terminal



Figure 5 – Dushanbe terminal – Gantry crane lifting a 40’ container



Figure 6 – Storage of old Russian standard containers



Figure 7 – Kudjand terminal – Russian container handled by a light gantry crane

Annex 10.1.1 Schemes of Railway Networks in Central Asia

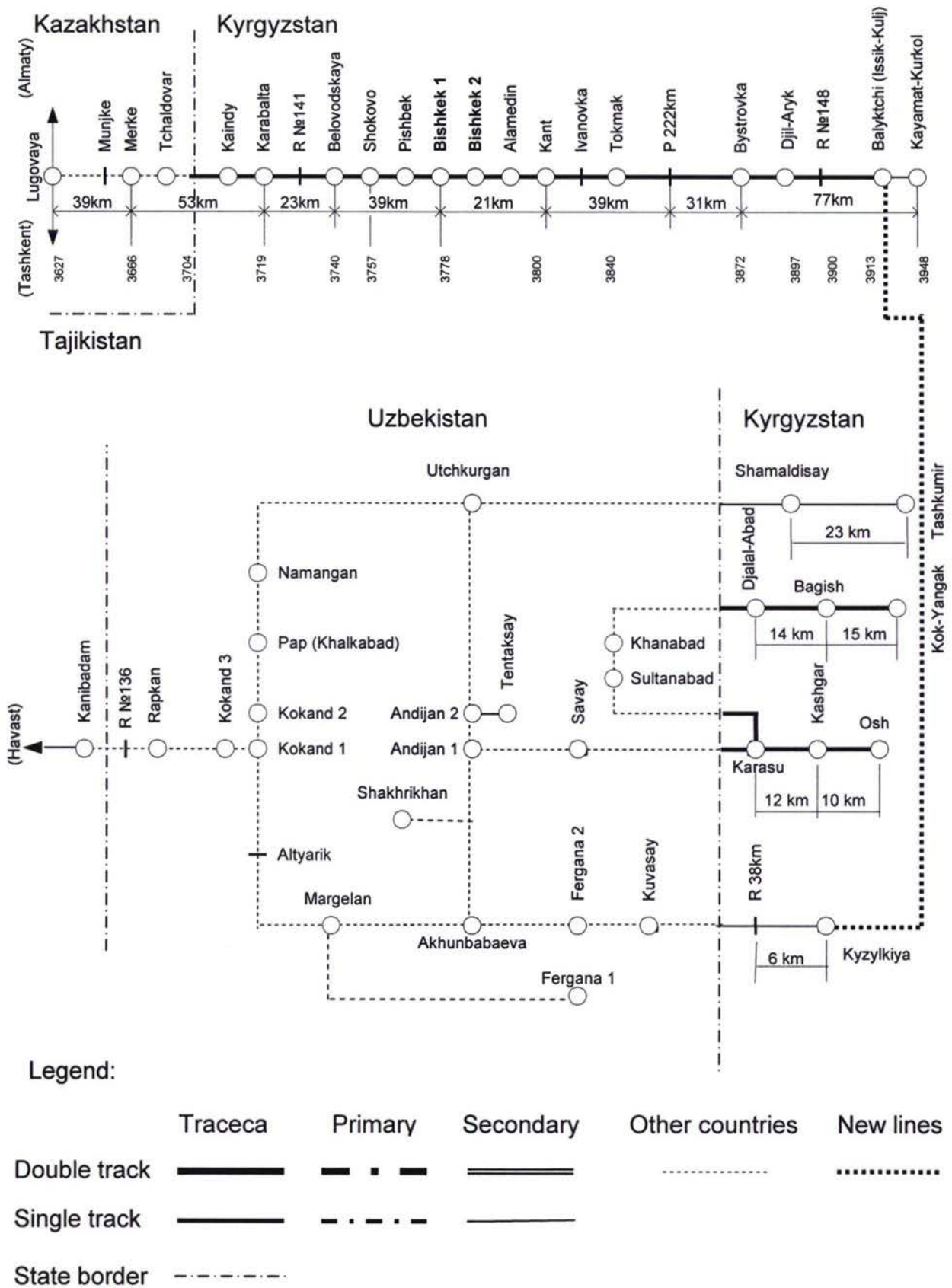


Fig. 1 Kyrgyzstan Railway Diagram

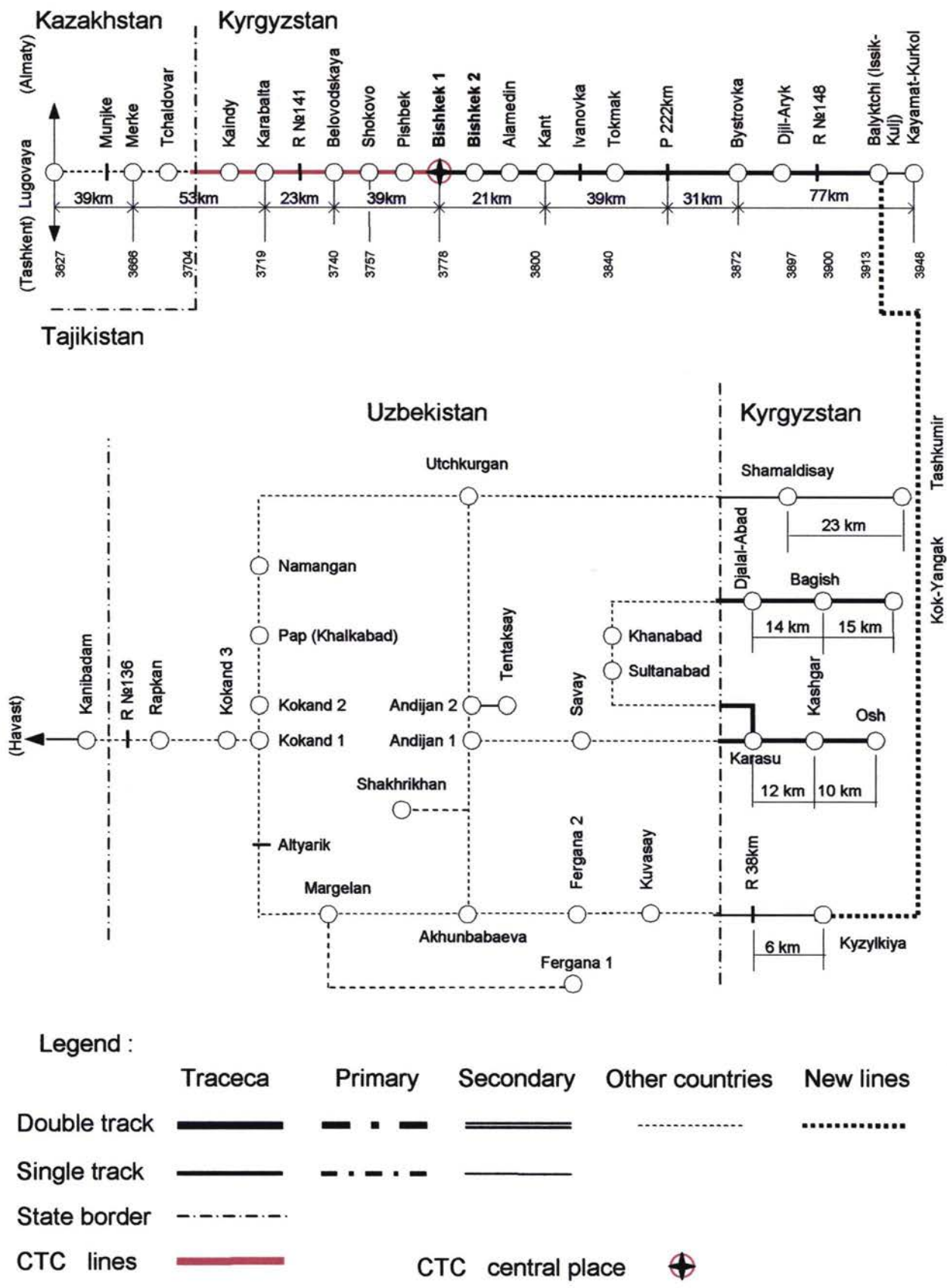


Fig. 2 Kyrgyzstan CTC lines

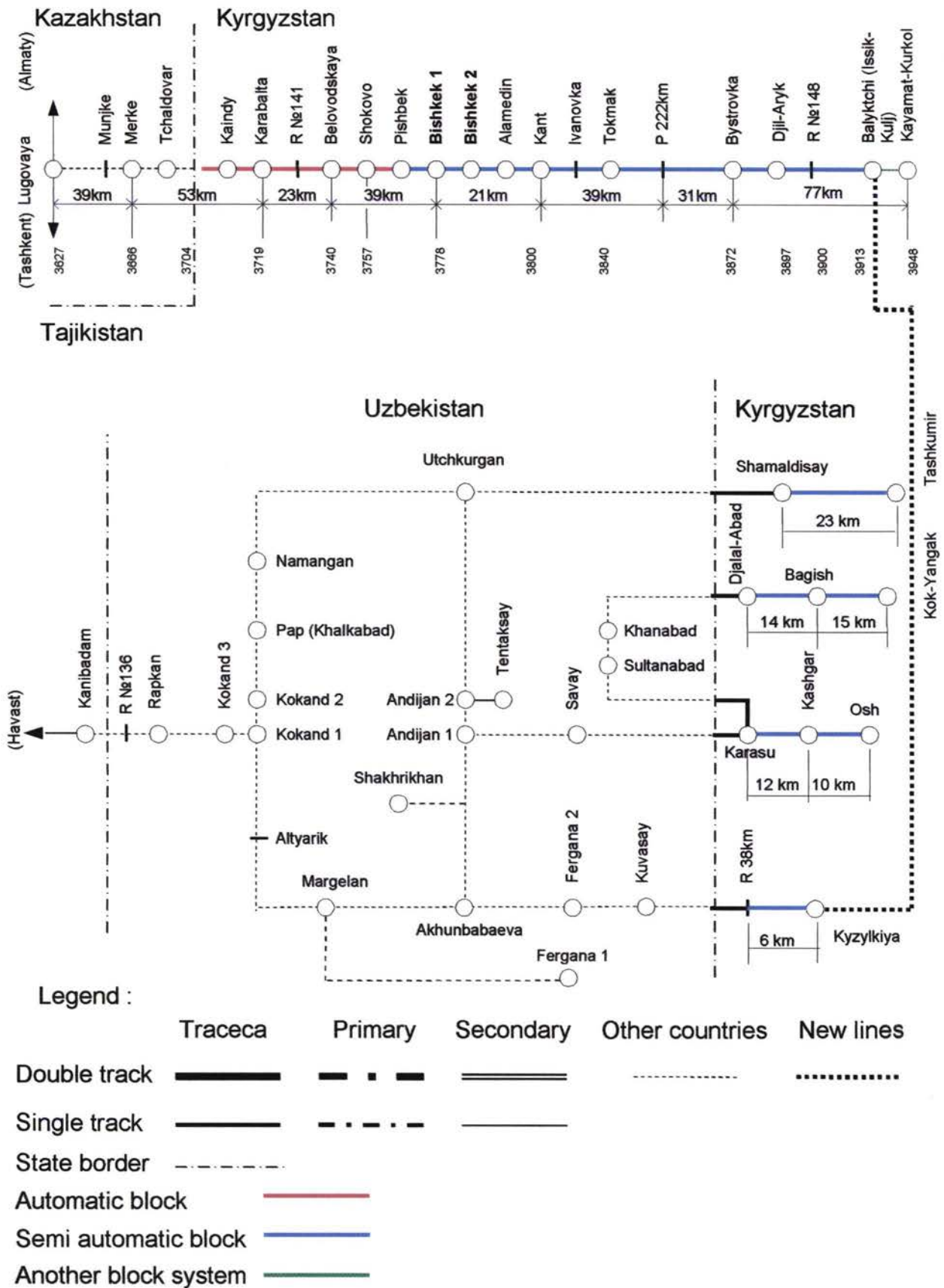
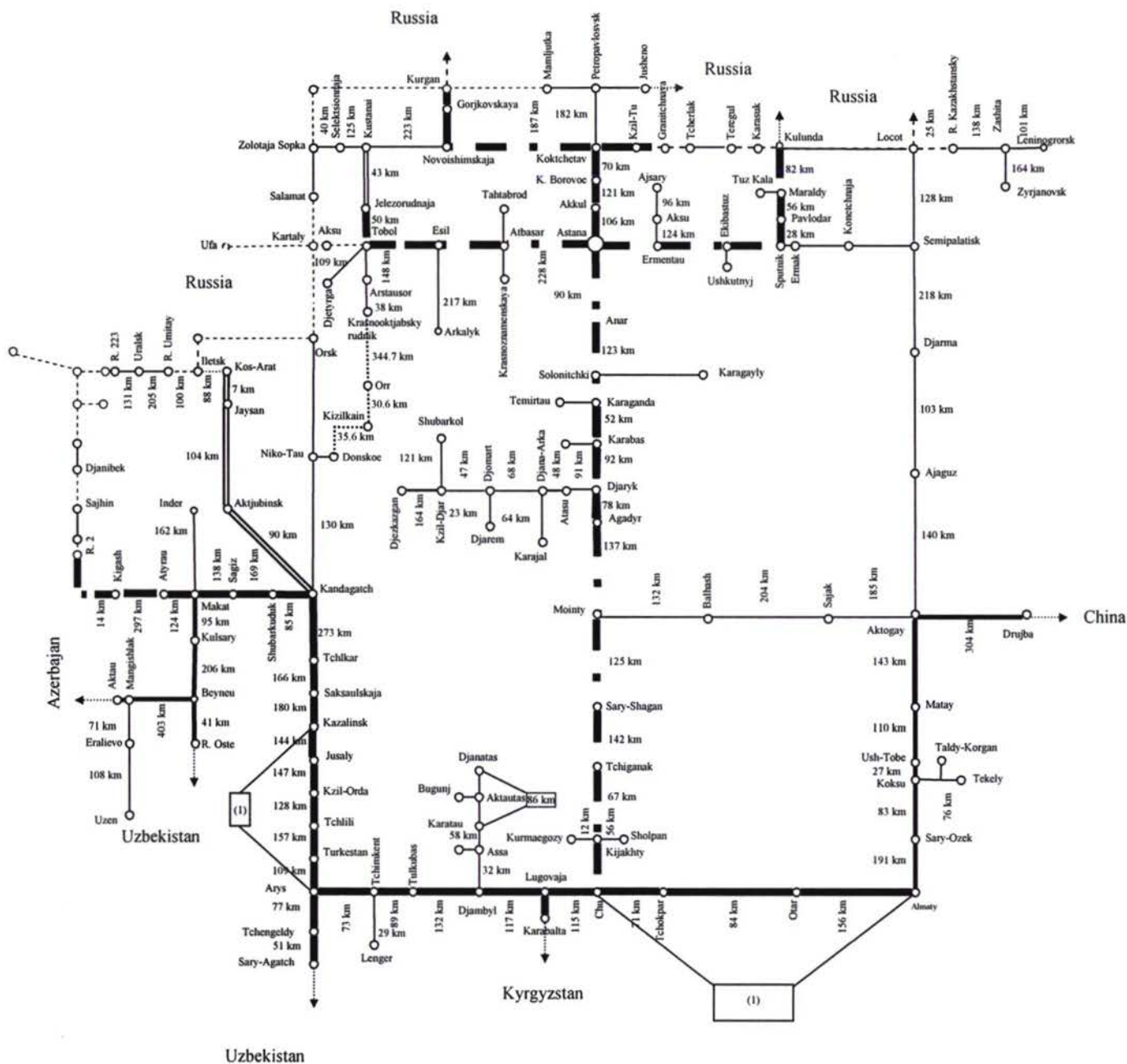


Fig. 3 Kyrgyzstan Block types

#	Line Section	With Automatic Block	With Semiautom. Block	Other type Block	Controlled by CTC	Without control	Lenth	No of Stations	Stations with Interlocking	Stations with MKD	Stations without Interlocking
1	Lugovaja - Pishpek	154	0	0	154	0	154	12	12	0	0
2	Pishpek - Rybatch'e	0	168	0	0	168	168	10	5	5	0
3	Osh Region	0	79	0	0	79	79	9	4	2	3
	TOTAL:	154,0	247,0	0,0	154,0	247,0	401,0	31	21	7	3

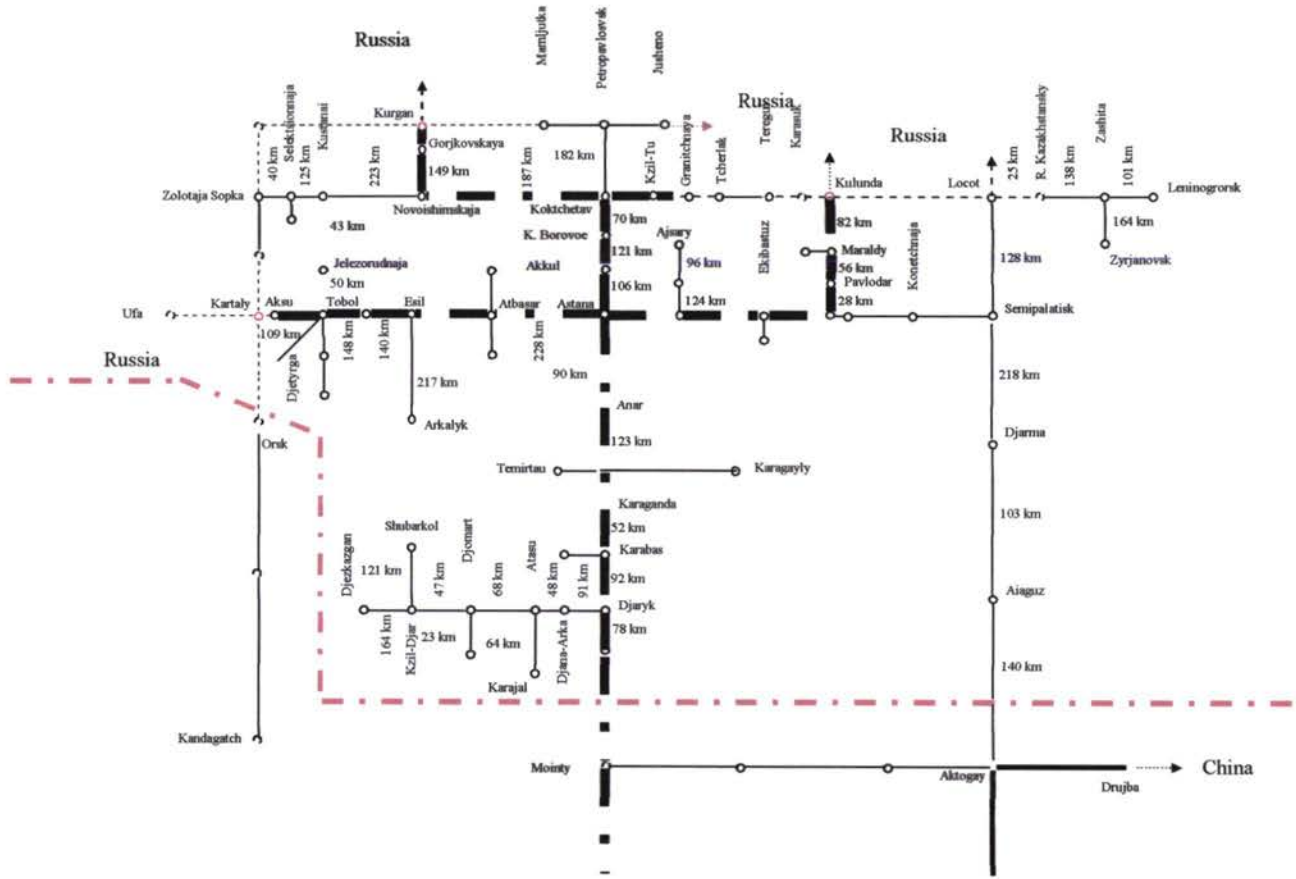
Fig. 4 Kyrgyzstan line data



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					

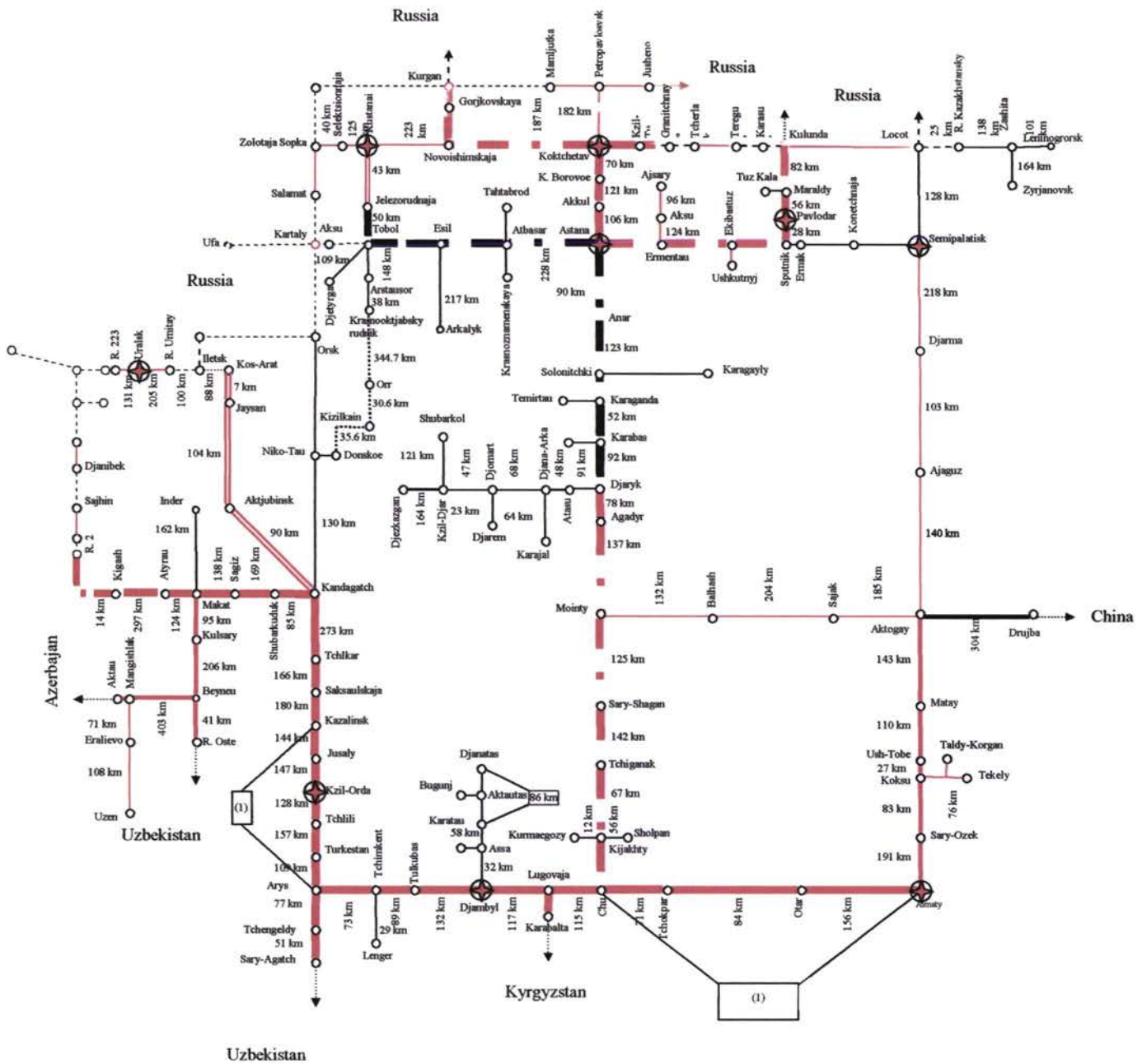
Fig. 5 Kazakhstan Railway Diagram



Legend:

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					

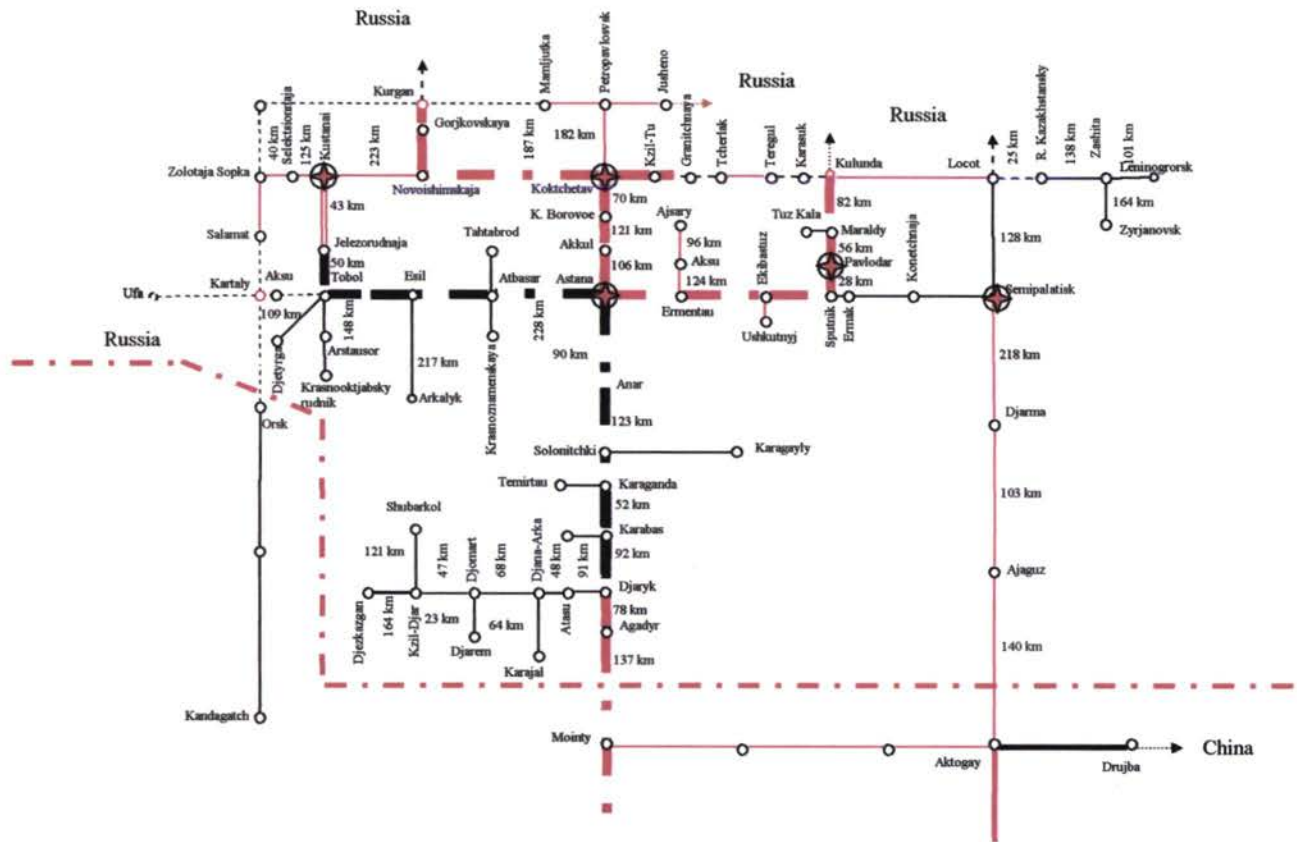
Fig. 6 North Kazakhstan Railway Diagram



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
CTC lines					
CTC central place					
(1) - Double track in sections					

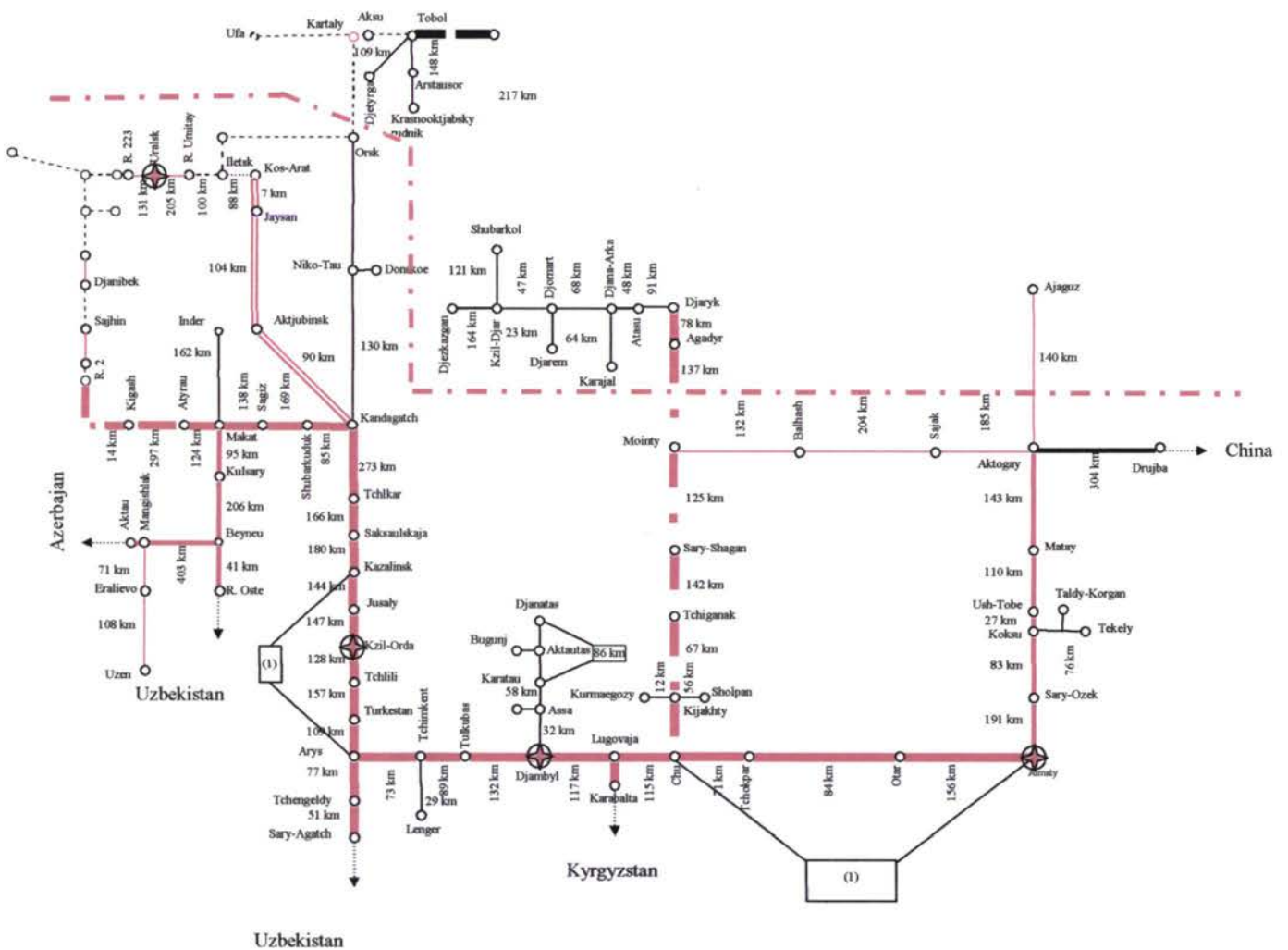
Fig. 8 Kazakhstan CTC lines



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
CTC lines					
CTC central place					
(1) - Double track in sections					

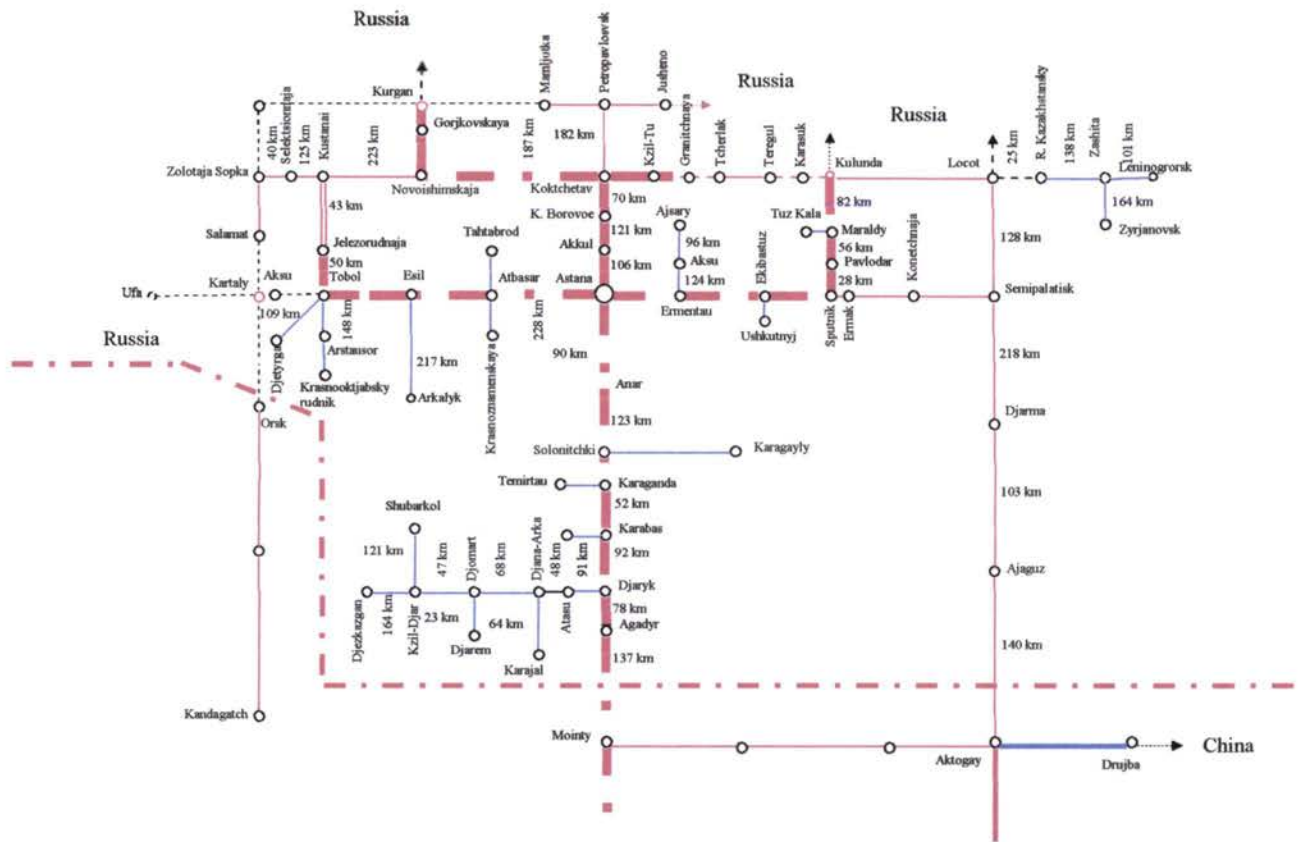
Fig. 9 Kazakhstan CTC northern lines



Legend:

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
CTC lines					
CTC central place					
(1) - Double track in sections					

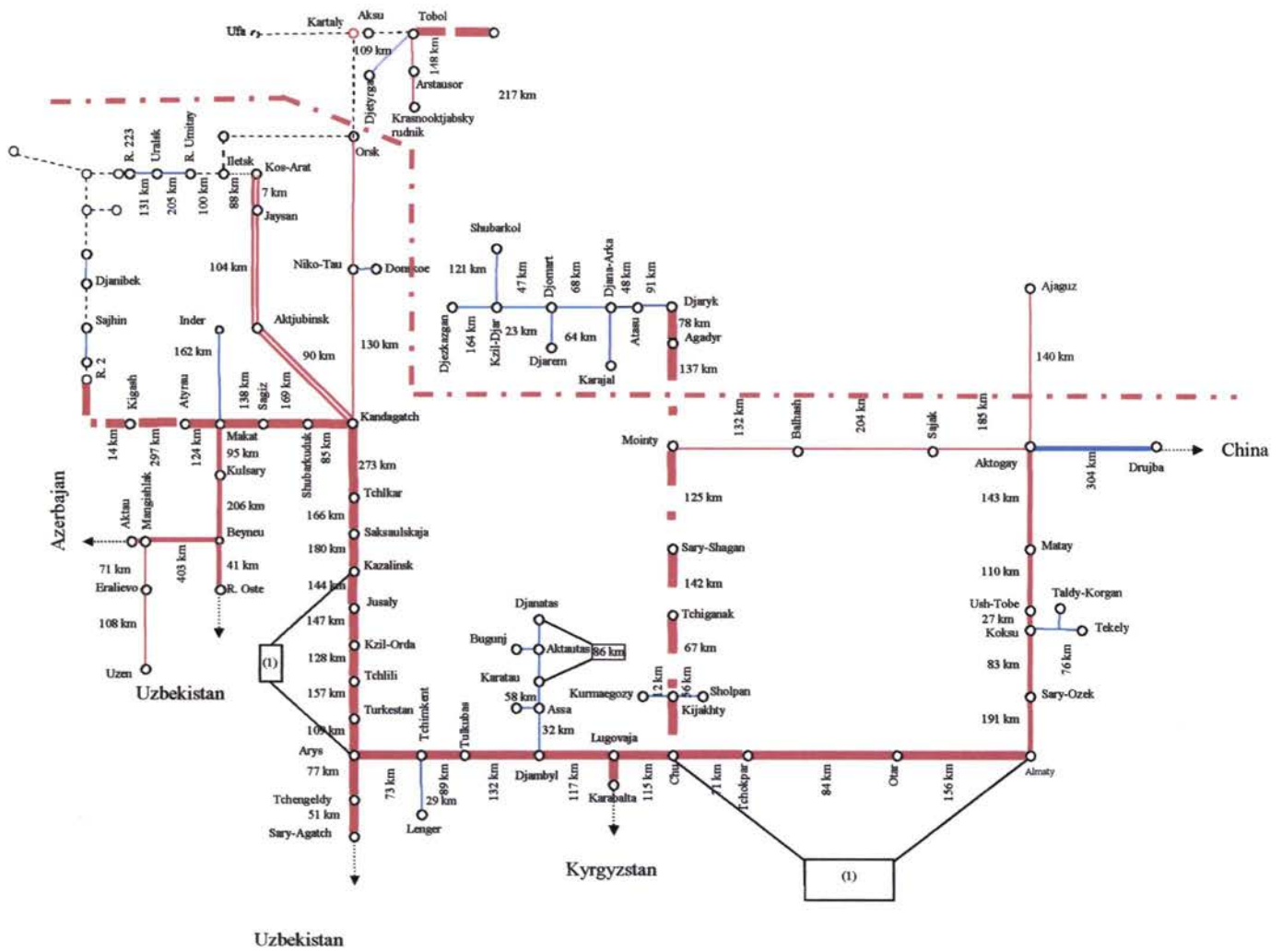
Fig. 10 Kazakhstan CTC southern lines



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
Automatic block system					
Semi automatic block system					

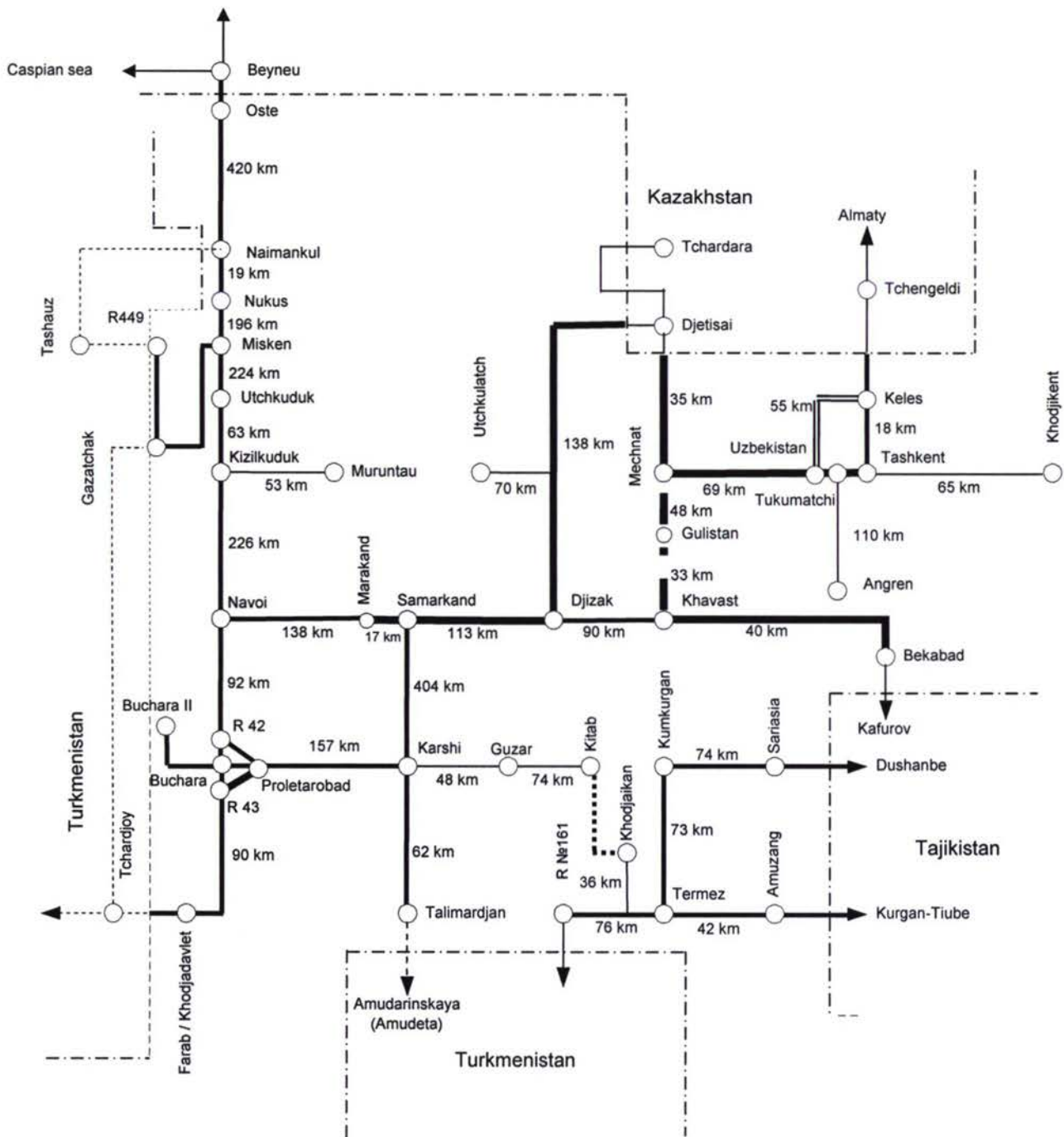
Fig. 11 Kazakhstan block types northern lines



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
Automatic block system					
Semi automatic block system					

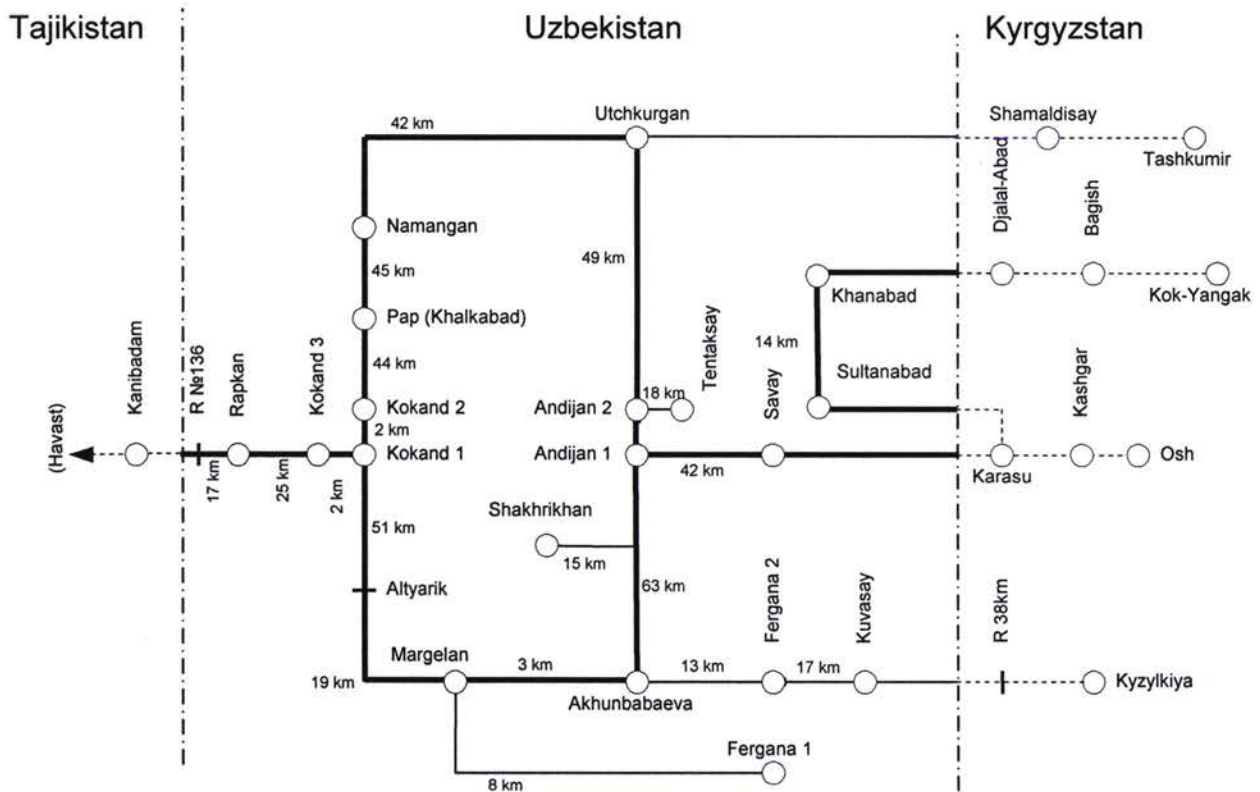
Fig. 12 Kazakhstan block types southern lines



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					

Fig. 13 Uzbekistan Railway Diagram 1.2



Legend:

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					

Fig. 14 Uzbekistan Railway Diagram 2.2

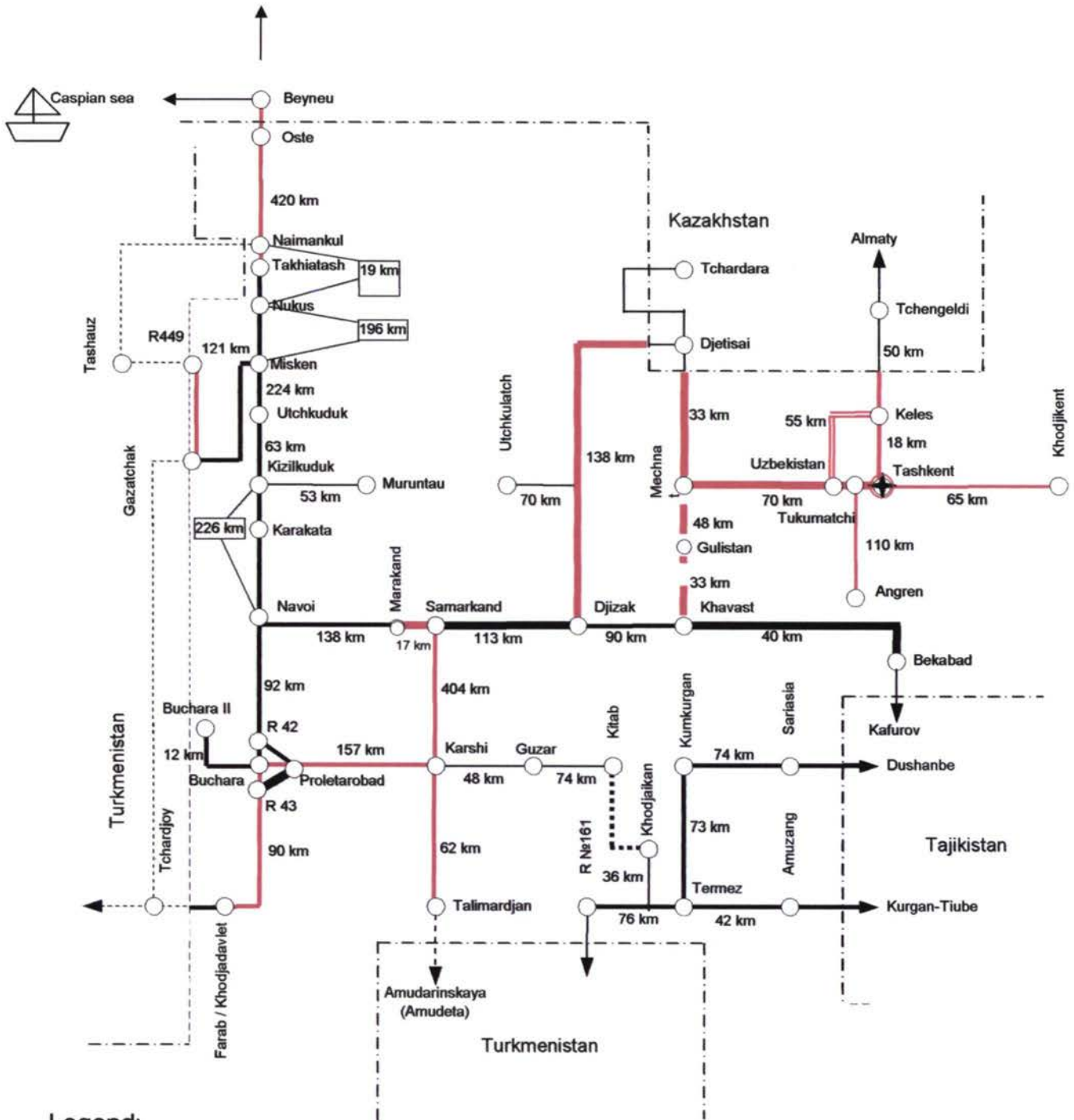


Fig. 15 Uzbekistan CTC lines 1

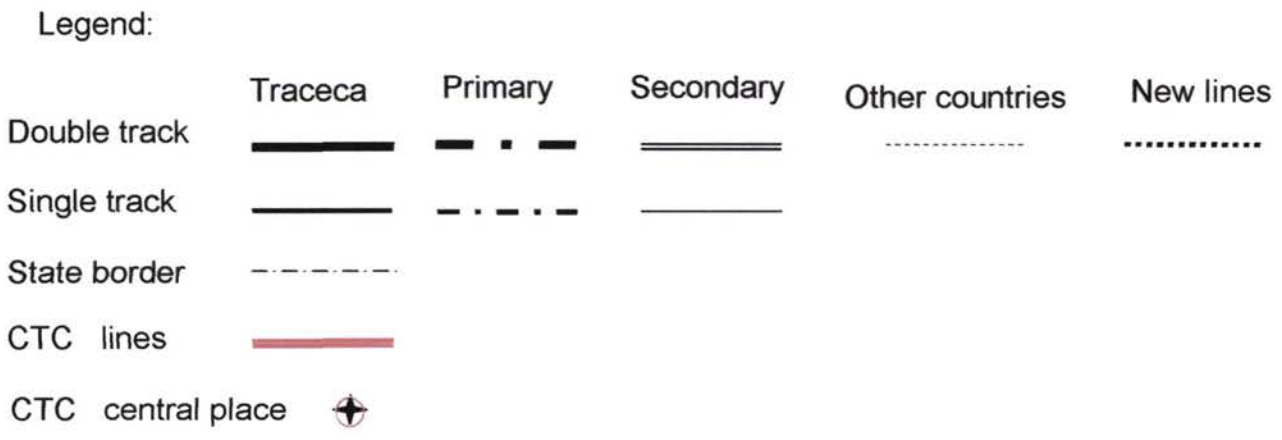
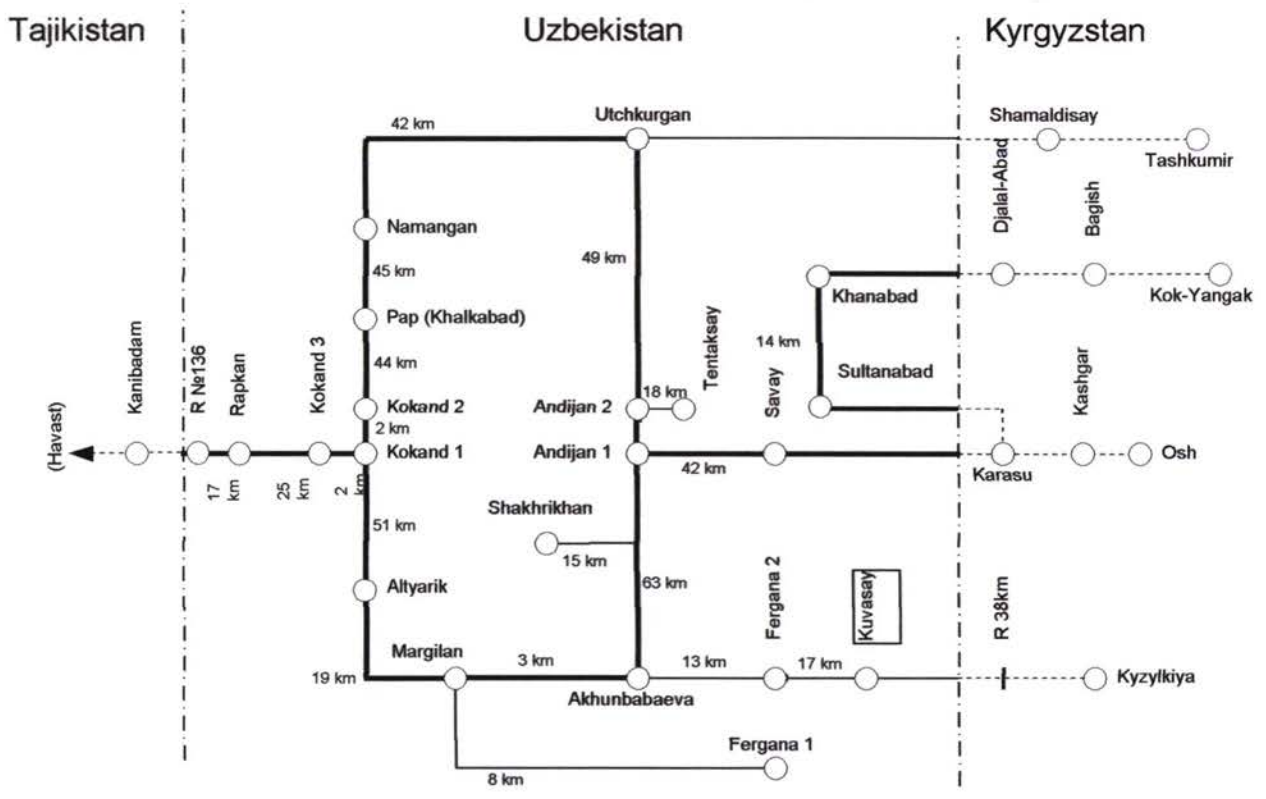
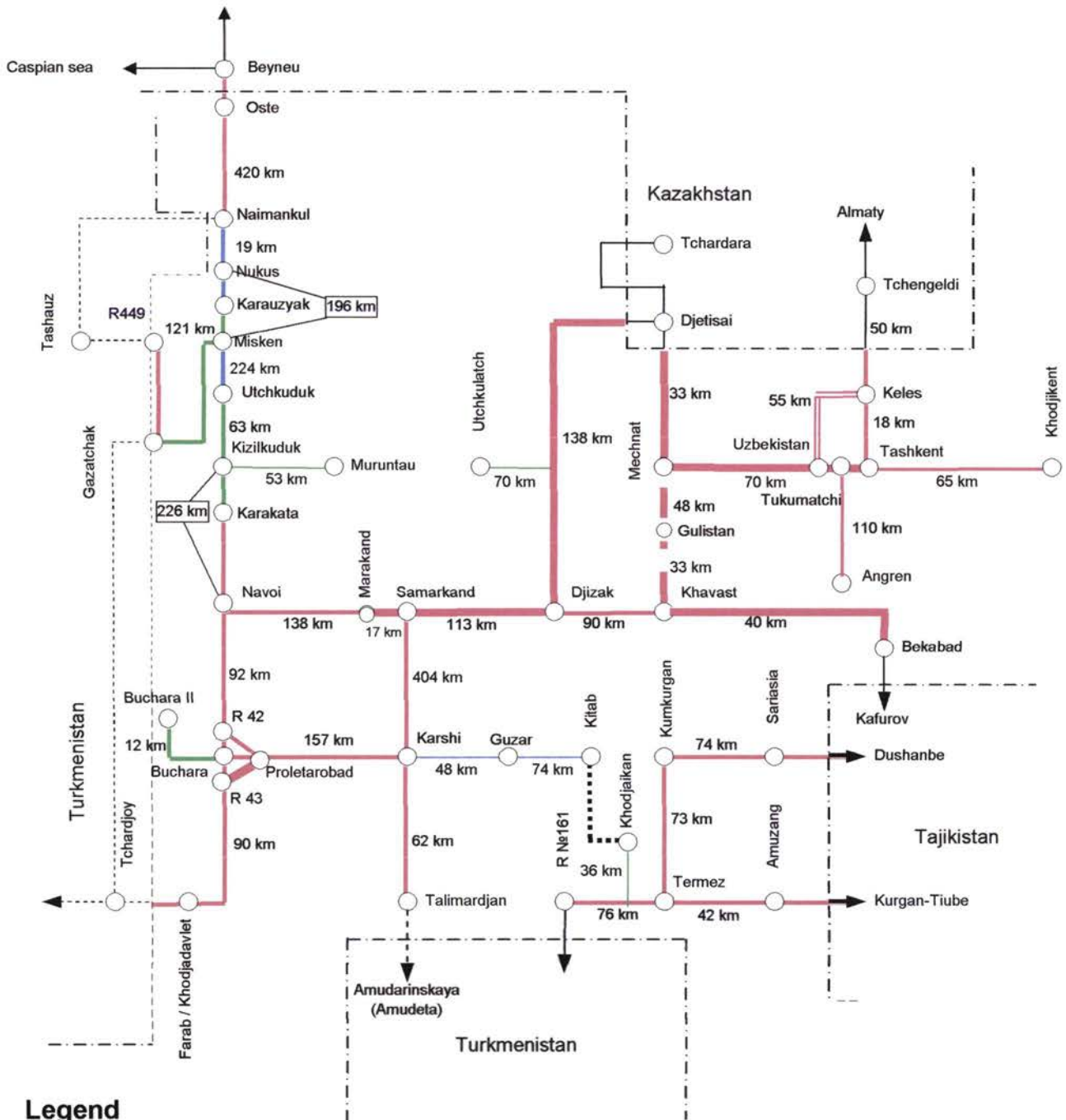


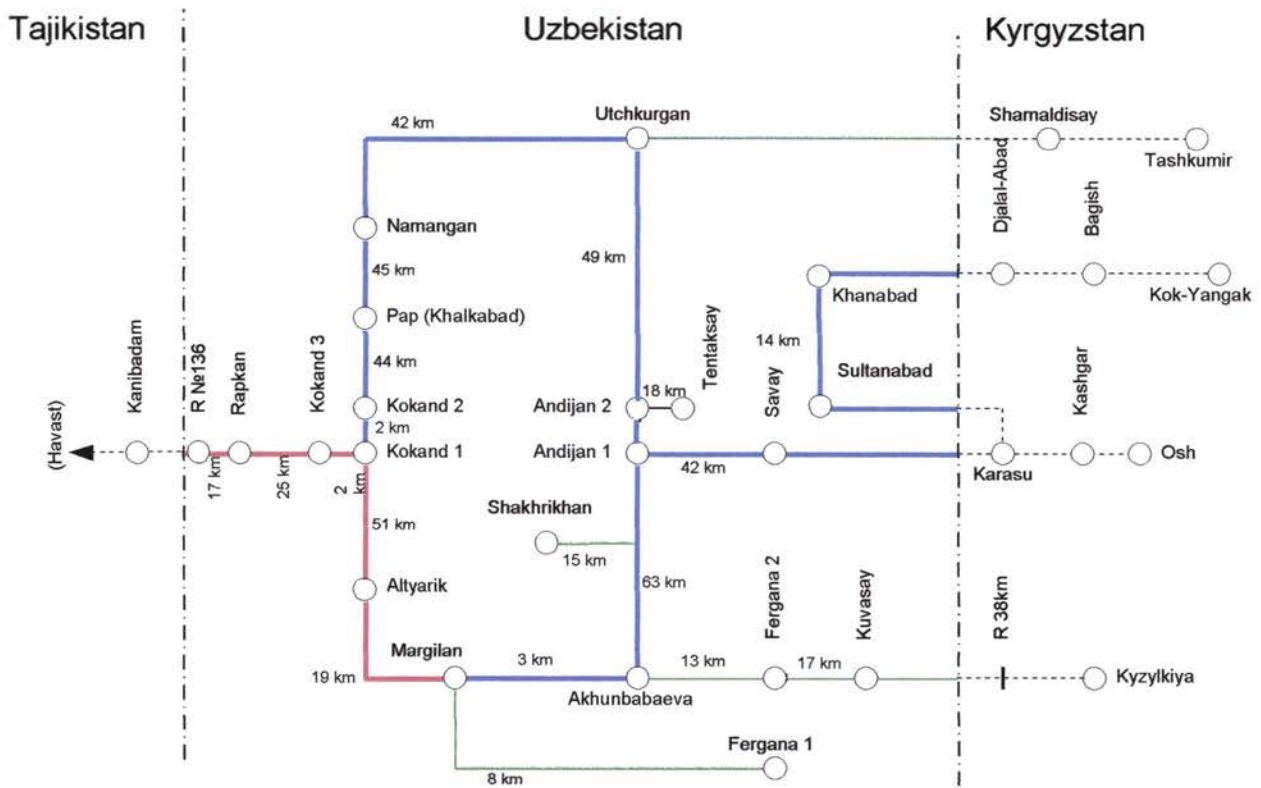
Fig. 16 Uzbekistan CTC lines 2



Legend

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					
Lines with automatic block system		Lines with semi-automatic block system		Lines with other block system	

Fig. 17 Uzbekistan Block types 1



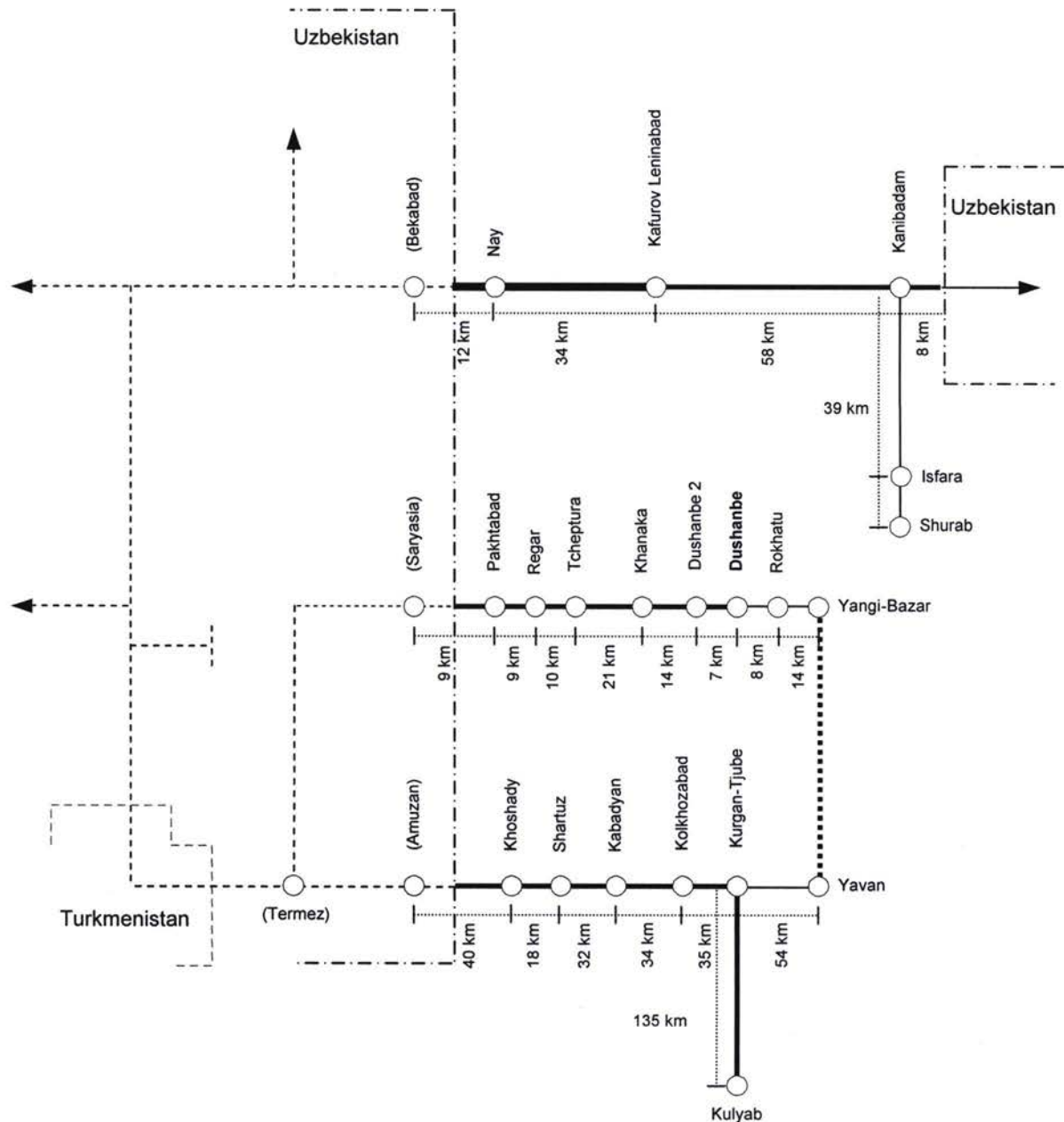
Legend:

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					
Lines with automatic block system		Lines with semi-automatic block system		Lines with other block system	

Fig. 18 Uzbekistan Block types 2

#	Line Section	With Automatic Block	With Semiautom. Block	Other type Block	Controlled by CTC	Without control	Lenth	No of Stations	Stations with Interlocking	Stations with MKD	Stations without Interlocking
1	Tashkent Junction	297,4	0	0	297,4	0	297,4	33	33	0	0
2	Tashkent - Khodjadavlet	689,7	0	42	149,7	582	731,7	66	64	0	2
3	Bukhara - Karshi	158,4	0	0	158,4	0	158,4	11	11	0	0
4	Marakand - Saryasia	467,5	121,7	35	62,6	561,6	624,2	37	36	0	1
5	Navoi - Nukus	0	444,3	332,2	0	776,5	776,5	30	13	12	5
6	Nukus - Beyneu	508,9	35,2	39,5	508,9	74,7	583,6	30	27	3	0
7	Misken - Shavat	129,8	0	23,6	129,8	23,6	153,4	10	10	0	0
8	Mekhnat - Djizak	122,1	0	70	122,1	70	192,1	8	7	0	1
9	Khavast - Andijan	154,4	165,9	28,2	0	348,5	348,5	31	22	7	2
10	Kokand - Andijan	0	185	27,5	0	212,5	212,5	15	10	3	2
	TOTAL:	2.528,2	952,1	598,0	1.428,9	2.649,4	4.078,3	271	233	25	13

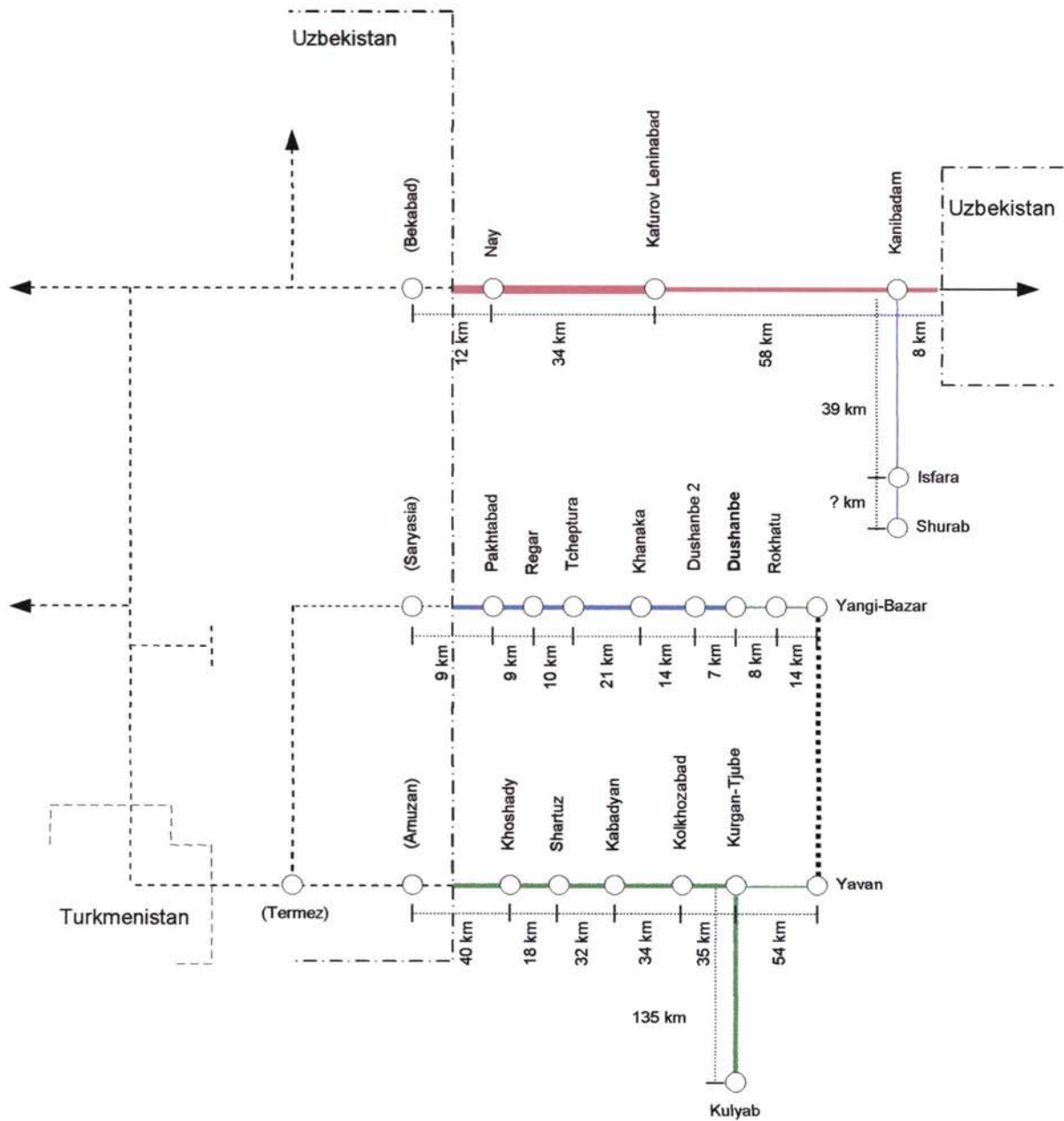
Fig. 19 Uzbekistan lines data



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track	▬▬	▬ . ▬	▬▬▬	-----
Single track	▬	- . - . -	▬		
State border	- - - - -				

Fig. 20 Tajikistan Railway Diagram



Legend :

	Traceca	Primary	Secondary	Other countries	New lines
Double track					
Single track					
State border					
Automatic block					
Semi automatic block					
Another block system					

Fig. 21 Tajikistan Block Types

Annex 10.1.2 COMPUTER-BASED STATION INTERLOCKING SYSTEMS

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0 ACRONYMS

ATP	Automatic Train Protection
CBIS	Computer-Based Interlocking System
CENELEC	European Committee for Electrotechnical Standardization (Comite Europeen De Normalisation Electrotechnique)
CTC	Centralized Traffic Control
E	Enable, remotely controlled station
E-MI	Part of the station is remotely controlled, part is locally managed by MI
EN	European Norm
ERTMS	European Railway Traffic Management System
FS	Italian State Railways (Ferrovie dello Stato)
IT	Intervention time
LC	Level Crossing
MI	Movement Inspector
MTBF	Mean Time Between Failures
OT	Operator Terminal
PC	Personal Computer
PCB	Printed Circuit Board
RAMS	Reliability, Availability, Maintainability, Safety
RAW	Route with Automatic Working
RT	Recovery Time
SE	Station of Entry
TD	Train Dispatcher
TDE	TD Exclusion
TLC	Telecommunications
TSE	Temporary Station of Entry
MD	Mimic Diagram
FK	Functional Keyboard
OT	Operator Terminal

1. INTRODUCTION

The scope of this Annex is to indicate the functionalities which must be guaranteed by the system adopted for the signaling and safety installations (interlocking devices) in the stations involved in the project.

2. GENERAL

The signaling must satisfy the following basic requirements regarding the station equipment:

- remotely controllable from a distant operating center
- easily modifiable in case of subsequent changes to the track plan or the doubling of the line
- easily interfaceable to the existing train protection systems based on track circuit automatic block and to the possible future Level 1 or 2 ERTMS systems
- easily maintainable due to the high level of diagnostics intrinsic to the equipment and to the component and part modularity
- Interfaceable with the wayside equipment currently use by the state Railway.

Concerning the train protection wayside equipment, the automatic block system will be kept and expanded along the entire line.

The possible introduction of a system complying with ERTMS requirements may become desirable in the future. The ease of interfacing with the ERTMS systems should therefore be kept present while defining the station equipment.

Considering the above requirements, it is advisable to use the electronic equipment which is based on computer-supported safety architecture and containing both digital and analogue electronic interfaces to the controlled signaling devices.

3. EQUIPMENT CHARACTERISTICS

The electronic equipment shall consist of the following subsystems:

- Centralized command/control program operating through the safety architecture with a redundant computer (2 out of 2 or 2 out of 3)
- Operator interface including: high-performance video screen, functional keyboard for the safety commands, personal computer or workstation with a monitor, keyboard and mouse
- Supporting functions which activate the data acquisition related to the system and equipment for both diagnostic and statistical and fiscal purposes, linking to the remote control system, other possible services an supervision functions for the traffic management support
- Power supply, control and diagnostics of the wayside devices and of cables through the modular digital and/or analogue interfaces capable of data interchange with the centralized program by means of the concentrators based on computer safety architectures.

3.1 RAM standards and requirements

The described equipment must comply with the applicable CENELEC standards:

- EN 50121 Railway applications. Electromagnetic compatibility
- EN 50124 Co-ordination of Insulation
- EN 50125 Railway applications. Environmental conditions for equipment. Equipment on board rolling stock.
- EN 50126 Railway applications. The specification and demonstration of reliability, availability, maintainability an safety (RAMS)
- EN 50128 Procedures and requirements for the development of railways safety software

- EN 50129 railway application. Safety related electronic systems for signaling
- Due to the importance of the reliability, availability and maintainability (RAM) related performance, we are giving the guidelines to be used as a base in contract specification. The indices declared by the manufacturer must equal or exceed those required for the three characteristics of reliability, maintainability and availability during the entire lifetime of the equipment, provided that system is maintained as scheduled. The values to be guaranteed are referred to:
- The entire equipment
 - Its main subassemblies.

3.1.1 Reliability requirements for the main equipment

Beside the overall system reliability, the supplier must declare and guarantee the reliability (MTBF) of the single pieces of equipment within the supply. The main functional and physical subassemblies under review and their respective minimum MTBF values required by the most European railways are listed in the table below for reference purposes:

Table 3.1.1: Reliability standards

Subsystem	MTBF (hours)
Movement logic	100.000
Device controller	300.000
Operator terminal	70.000

3.1.2 Maintainability requirements

The aspect of the project related to the ease of inspectability and maintainability of systems must be well studied, taking into account the configuration, location and characteristics of the components and subsystems.

The values shown in the Table 3.1.2 will be assumed in the computation of the system maintainability index, where:

IT: Intervention Time, i.e. the time elapsed between the signaling of failure and the arrival of the maintenance team on site

RT: recovery time, i.e. the time required for the decisive intervention against the malfunction, including the times required to:

- Diagnose the failure
- Isolate the failure
- Replace/repair the failed component
- Functional test of the replace/ repaired component to establish the operating state.

Table 3.1.2: Standards of maintainability

Subsystem	IT (minutes)	RT (minutes)
Central equipment	Variable	30
Area Manager	Variable	30
Wayside equipment	Variable	30

3.1.3 Availability requirements

Beside the availability of the entire system, the supplier must also declare and guarantee the availability of the single main pieces of equipment listed below.

The equipment under examination and the proposed minimum availability values required by most European railways are as follows:

Subsystem	Availability	Unavailability (minutes/year)
Movement logic	0.999990	5
Area Manager	0.999990	5
Device controller	0.999990	5
Operator interface	0.999960	21
Auxiliary functions	0.999950	26

4. DIAGNOSTICS

4.1 Diagnostics of the computer-based system

The main function of the diagnostics is to control the functional state of various subsystems or nodes of the computer-based system and to automatically disconnect and unavailable node or reconnect to the network a node which was recovered into normal operation.

The diagnostics at the stem level must:

- Periodically execute diagnostic programs on-line which target single system elements and recover them as needed
- Inform the operator on the results of the diagnostics run at various levels.

Beside the diagnostic messages being made available, there must be detailed alarms related to the single node or its modules.

These alarms must be easily retrievable and interpretable by the maintenance operator.

4.2 Yard device diagnostics

The analogue values shall be acquired with a frequency exceeding the greatest possible frequency of the variation of the value examined.

The values acquired and elaborated by the system must be retrievable using simple procedures and a portable terminal. The latter will be capable of displaying the data in both graph and table forms. The terminal will also be capable of storing procedures for on-line configuration of diagnostic parameters (alarm levels, sampling frequencies, graph types, etc).

The alarms detected by the diagnostic systems shall be communicated to the operator (peripheral or central) in charge of the maintenance.

The acquired and elaborated values pertaining to the diagnostics and all controls shall be made available to the external systems through a serial communication line.

5. TYPES OF EQUIPMENT

The functional block diagram related to the various application types of our project are described in the following text.

5.1 Remotely controlled station, normally unattended

The electronic equipment controls the functions of the station devices and movement management in full safety.

The supervision, diagnostics, maintenance and support function are taken care of the central line Control System. All the diagnostics and event recording information is relayed to the Center by the equipment for further processing.

No operator terminal is foreseen. Local management of traffic in case of disconnection from the Central Pace will be ensured by the interface operator (functional keyboard and mimic diagram).

Fig 5.1 shows the functional block diagram adopted

5.2 Remotely controlled station, normally attended

This case is referred to the stations remotely controlled by a centralized control in which the presence of the Movement Inspector is required by the service needs.

The operator interface in this case is complete. It includes the Operator terminal, Functional Keyboard and Mimic Diagram.

The scope of the Operator Terminal (OT) that includes video and mouse is to make the operator access the system functions more easily and directly.

The typical movement functions such as route definition, single device controls: points, signals, LCs, abnormal situation and alarm management functions, as well as the form and messaging functions can be activated from the OT.

Fig. 5.2 shows the functional block diagram of the CBSIS system for the reviewed type.

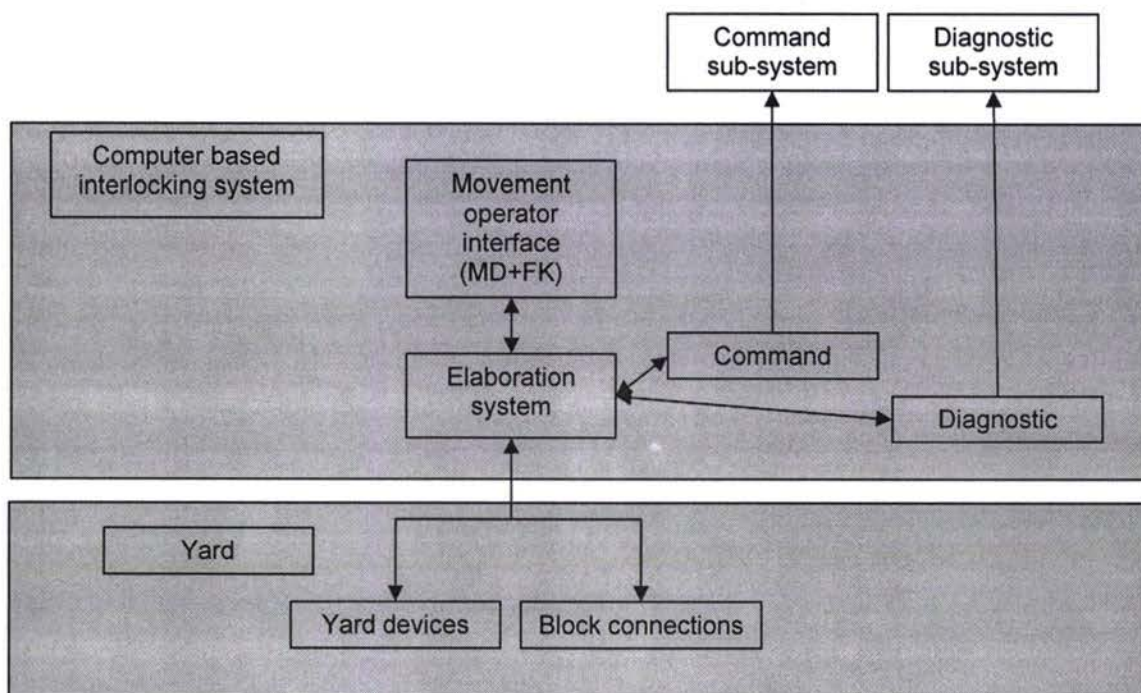


Figure 5.1

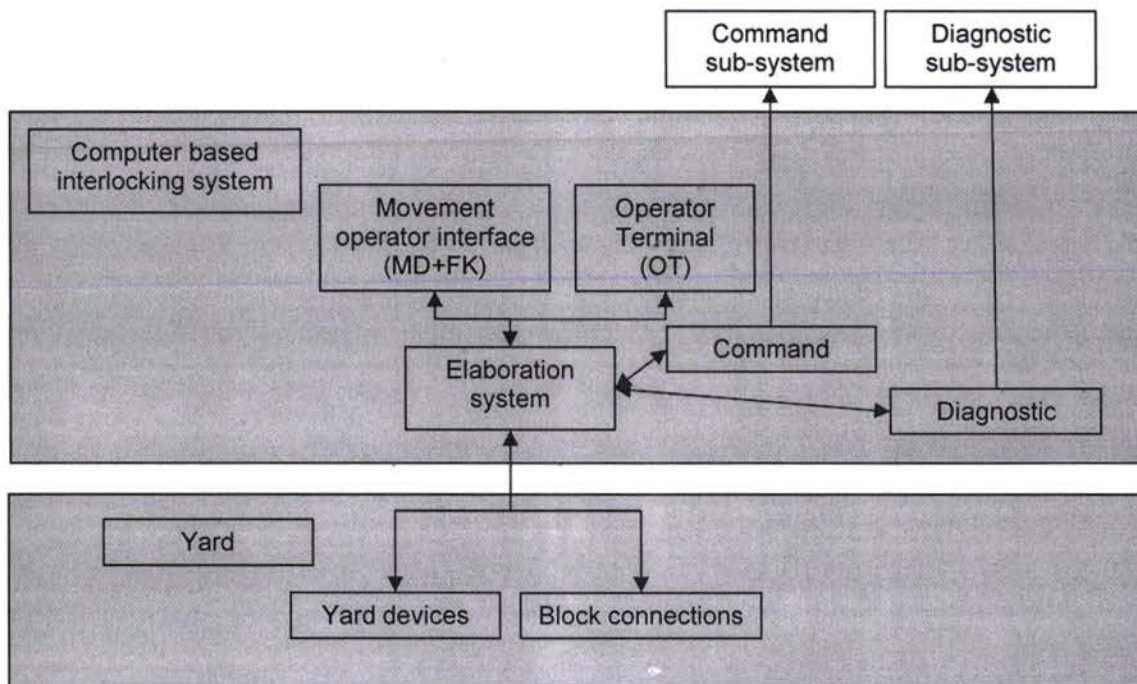


Figure 5.2

6. OPERATING MODES

The station Equipment may operate under the operating modes listed and summarized below;

- ❖ E (enabled and remotely controlled): in this mode the equipment receives the instruction from a central remote control location
- ❖ E-MI (management is distributed between the local Movement inspector, MI, and the Train Dispatcher, TD): in this mode the wayside is divided into two sections:
 - the remotely controlled section
 - the section managed by the MI.

The remotely controlled area normally includes the route tracks to which one or two priority tracks are added.

The TD can remotely control only the routes within his jurisdiction; he cannot control the single devices nor dispatch trains with closed signals.

The routes involving both areas are controlled jointly between the TD and MI.

- ❖ SE (Station of Entry): In this mode the equipment is controlled locally, but the departing routes require the TD confirmation to the departing train jurisdiction. In the case of the equipment which is not remotely controlled, located at an extremity of a remotely controlled line, the mode becomes SE.
- ❖ If the equipment is remotely controlled, the mode becomes TSE (Temporary Station of Entry).
- ❖ TDE (TD Exclusion): On this mode the instructions and confirmations originating in the remote control system are excluded.
- ❖ TDE (TD Exclusion): IN this mode the instructions and confirmations originating in the remote control system are excluded.
- ❖ RAW (Route with Automatic Working): in this mode the switches along route tracks and those which make the route tracks independent from the remaining tracks, are blocked to make the station and extension of the line. The rout instructions are activated directly by the train.

The operation mode proposed for the stations normally unattended is E/TDE/RAW.

The operation modes proposed for the stations of normally unattended with modest volume of traffic managed and at the beginning of the remotely controlled sections are E/SE/TDE/RAW.

7. SYSTEM UPGRADEABILITY REQUIREMENTS

The equipment will have to comply with some design, construction and functional requirements in order to achieve high flexibility of the system and to be able to modify it easily after it has been put into service. It must be possible to build a station system (equipment + yard) in a step-by –step manner, to reduce to the minimum the impact to the service and the organization of the station.

The supplier of the equipment described here must therefore have and make available to the Beneficiaries adequate computer tools for the design and testing of both hardware and application software for the system. The instruments shall have been validated and approved by a European railway institution or certified by a recognized certifying body. Factory testing or the modified system must be made possible by means of a “mirror” system equipped with the simulators for programs and distant locations for the commercial and control of the wayside entries. The equipment shall allow the station configuration to be changed:

ON LINE, with an interruption of the service for approximately 30 min, required for the modification of program or of yard equipment which do not call for the variation of tracks and devices.

ON LINE, with a service interruption of up to an hour, required for every type of modification implemented and tested in factory.

The modified version must be capable of being installed and activated only for the time required by the field testing.

The current version of the system must be reactivable after each test of the modified version, until the final activation of the latter. The field testing will be limited to the off-line testing of the power supplies and of the correct connections with the new devices, and to a functional system test. They will be conceived to be carried out, as far as possible, during inactivity of the entire system or of the components under testing.

8. MAINTENANCE

It will be possible to transfer all diagnostic data collected by the computerized system to a dedicated diagnostics and maintenance system, giving the maintenance manager a computer-aided failure and maintenance management.

The subsystem shall have an interface for the maintenance technician who will access the information related to the state of the system or of single elements and the information related to the maintenance of the devices, system components and subsystems at regular intervals.

The interface will also be used by the maintenance manager to exchange confirmation and modules with the person in charge of movement.

The subsystem shall elaborate the data acquired from on-line measurements and those related to the single system components stored in the general files of the maintenance subsystem.

The diagnostics and maintenance system shall make available its data to the area maintenance center through a serial data communication.

The diagnostics and maintenance system shall:

- ❖ Determine the current state of the system (system equipment, telecommunication equipment, peripheral installations and infrastructure, etc);
- ❖ Support the research technician in failure locating and repair;
- ❖ Support planning management and the carrying out of the maintenance activities;
- ❖ Elaborate failure statistics related to its consistence and jurisdiction;

- ❖ Manage the system “configuration”;
- ❖ The subsystem functions may fit into two major groups:
 - Diagnostics and Maintenance of installations;
 - Diagnostics and Maintenance of the system.

The Diagnostics and Maintenance of installation include all automatic or operator activities carried out through the subsystem instruments and involving all equipment, devices, auxiliary system, etc of a station, generally known as installations or infrastructure.

The Diagnostics and Maintenance of the CBIS system refers to the equipment and software installed in it and the connection network. The subsystem will be capable of exchanging data with external systems in order to either receive diagnostic/ maintenance information useful in CBIS –related activities or to make available diagnostic or maintenance information from its files.

8.1 Diagnostics and maintenance of installations

8.1.1 Goals

The Installation Diagnostics shall monitor the state of:

- signaling installations
- TLC equipment and network
- auxiliary Technological installation.

There are two main subsystem goals:

- provide suitable instruments for the activation of maintenance work and for the operation support during an intervention, with a special consideration to the implications of such activities for the traffic;
- make available in real time the information on the state of installations and infrastructure to the external system which now manage maintenance at the NETWORK level.

Achieving the first goal will allow the preparation of the information base needed to achieve the second one, since the information pertaining to both aspects is generally the same, even if subsequent processing and the related instruments may serve different purposes.

8.1.2 Support to the maintenance activities

The support to the maintenance personnel will be provided by:

- the diagnostic function of fault finding, including an efficient management of fault location and indication of malfunction. All anomalies originated by failures shall be detected and indicated on a timely basis to the operator involved;
- graphic and/or alphanumeric display of scheduled maintenance of devices, unavailability of installations, of predictive fault evaluations, etc;
- operator guidance for the replacement and recovery of failed components using procedure guiding and the possibility to access the technical documentation of all the equipment in the system;
- auxiliary maintenance management functions (statistics, forms, records, etc).

8.1.3 On-line diagnostics

These functions shall detect faults and malfunctions on the monitored systems by performing specific tests on the state signaling (controls and messages) coming from remote locations.

These tests may also involve single components which will be reflected both on the database structure, acquired on corresponding levels, and on the messaging and type of display managed from the workplaces.

Any reference parameters for the sensing of faults and anomalies (thresholds, tolerance limits, etc) typical of the monitored installations shall be determined by the manufacturer).

8.1.4 Predictive diagnostics

Predictive type of processing will be possible for certain installations, i.e. starting from the current conditions and using specific parameters and models of the installation or equipment, useful indications will be obtainable in order to prevent wear-induced or other failures.

The acquired or processed data shall be used to:

- Signal current or predicated failures and anomalies,
- Show in the real time the operating conditions of the installations,
- Build records to be used in future processing, either on or off-line, for instance in support of maintenance management procedures, to achieve the on-condition maintenance.

8.1.5 Alarm management

When a malfunction occurs, the subsystem shall generate alarms and start recording procedures related to the situation (alarm recognition, communication, etc).

Alarms shall be displayed in different colors, with or without blinking, depending on the presumed gravity of the failure, possible interference with the regular service, being "recognized" or "not recognized" by the operator.

8.2 Supporting instruments

The instruments for the support to the repair activities integrated in the subsystem will be the following:

- On-line operator guidance;
- Use of the technical documentation;
- Remote diagnostics and remote maintenance.

These instruments shall be accessible from any involved location equipped with the adequate peripherals.

8.2.1 On-line guidance

Once the anomaly has been signaled, the system shall supply the operator with all available information using guided procedures, in order to pinpoint the failed component or section of installation by examination of various schematic diagrams in increase detail down to the single PCB.

After the failed component had been found and replaced during maintenance, the system shall check the recovery of the functions and continue with its full operation.

The operational instructions will have to be configured and displayed automatically by the system when some diagnostic events occur.

8.2.2 Consulting the technical documentation

The manufacturer shall store the technical documentation (diagrams, drawings, specifications, manuals, etc) in memory using suitable formats, so that the diagnostics and maintenance operator can read them on video displays after starting the appropriate procedure.

8.3 Preventive maintenance

The management of the maintenance shall be activated by the procedures made available by the Beneficiaries and not included in the CBIS supply. The procedures shall interface with the Maintenance and Diagnostics subsystem. The interfacing shall be used for:

- System data communication
- Access to the system-resident functions
- Planning of the Diagnostics and Maintenance subsystem through the terminal.

Beside the procedures defined by the programmed maintenance of devices and devices, the planning and maintenance functions shall use the measurement of the characteristic values for each device. The measured values shall be related to the calibration values in order to indicate deviations from the tolerances.

Preventive maintenance shall use an electronic file containing the history records of the supervised device and parts of the system.

The history records shall be subdivided into:

- Static data consisting of the electrical calibration values for each device (operating voltage, current draw, operation time, shunting value, etc) and those from the list of planned maintenance and their frequency, grouped in tables;
- Dynamic data referred to the operating values for each device (hours of operation/ON hours, number of operation/ switching ON, etc) and the data related to the maintenance operations (dates of intervention, etc).

The preventive maintenance deadlines shall derive from the subsystem by correlating static and dynamic data.

8.4 Costs assessment

In order to settle the cost of the computer-based station interlocking systems we used following criteria.

We estimated investment values by average and current market prices of material and labour which are especially referred to EU prices being about innovative electronic equipment.

In order to arrive to the basic price of a CBSIS we valued that processing which, regardless of plant sizes, are, in any case, presents and somehow proportional to the number of the controlled devices.

These valuations has been referred to two size plants. Both are referred to a station of a single track line equipped by automatic block and with a level crossing located in line.

The first size is relevant to a interlocking which manages 3 tracks, the second to a interlocking which manages 5 tracks

Once settled basic price we added the costs due to each really installed device

Subtotals are refreshed by the percentage of prices up-dating (presently 20%).

Finally we take into account that the market prices could change in the range showed in the table.

BASIC COSTS (€)	SIZE 1	SIZE 2
BASIC PRICE	232.240	335.697
CONTROLLERS PRICES	178.177	209.165
SUB TOTAL	410.417	544.862
PRICES UPDATING 20%	82.083	108.372
ESTIMATED TOTAL	493.000	653.234
TOTAL VARIATION RANGE	+/- 20%	+/-20%

To the totals must be added wayside devices costs only in the case of new outdoor equipments.

Of course to the estimated total, if necessary, must be added power supply and remote control equipment costs.

Such possible costs are the same of those of traditional all relay interlockings plants.

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SYNTHESIS OF FUNCTIONALITY OF BLOCK AND ATP SYSTEMS UTILISED ON EUROPEAN NETWORKS

1) ASFA (Spain)

ASFA is an ATP (Automatic Train Protection) system and of cab signalling installed on many RENFE lines (gauge 1676 mm), on FEVE lines (metric gauge) and on the new NAFA line (European gauge).

Asfa works on all the lines considered for interoperability.

The ground-board link is based on resonant circuits magnetically coupled able to transmit nine different data.

A ground resonant circuit is tuned on a frequency which represents signal meaning.

As far as safety is concerned the system is not "fail-safe" but safe enough to develop suitable supervision of the driver showing him signalling conditions, and compelling him to note possible restrictive signals.

Main characteristics

- 9 frequencies - Range: from 55 kHz to 115 kHz
- on board 3 different types of trains can be selected
- Supervision:
 - Recognition of restrictive signal by the driver in 3 seconds.
 - Continuous supervision of the speed (160 km/h or 180 km/h) after going past restrictive signal.
 - Speed control (60 km/h, 50 km/h or 35 km/h on the basis of train type) after going past a transponder located 300 m past the signal.
 - route of the train in the case of closed signal .
 - Line speed.
- Reaction:
 - Emergency brake is set on in the event that any supervision is evaded
 - Emergency brake can be set off when train is stationary

2) ATB (Nederland)

ATB exist in 2 base versions: ATB first generation e ATB new generation.

Description of ATB first generation:

The system is made up of coded track circuits and of an on board equipment informatic (ACEC) or of a conventional electronics (GRS).

Data transmission between coded tracks circuits and on board equipment has carried out through inductive coupled aerials located over the rails.

Main characteristics

- Data transmission to trains:
 - Carrier frequency :75 Hz
 - Speed codes :AM modulated
 - Speed codes :(40,60,80,130,140) km/h
 - 1 way out code
- Any train characteristic on board (Speed code detected on run)
- On driver display:
 - Speed corresponding to the speed code.
 - Acoustic signal in the event of code changed
 - Sound of a bell in the case system needs brakes
- Supervision:
 - Speed (continuous)

- Reaction:
 - Emergency brake is activated in the event of over speed and in the event that the driver does not intervene after a warning acoustic signal

Description of ATB New Generation:

The system is made up of transponder (balise) along the tracks and of an on board equipment. Besides an "infill" function based on a cables loop is available

The data transmission is between the activated balise and the on board aerial.

The system feels direction, the balises are assembled nearly in the middle of rails.

The on board ATBNG equipments are fully interoperables with ground ATB equipments of first generation.

Main characteristics

- Data transmission to trains:
 - 100 kHz +/- 10 kHz (FSK)
 - 25 kbit/sec
 - 119 bit utilised for each telegram
- Train characteristic put in by the driver
 - Train length
 - Train maximum speed
 - Train brake characteristics
- On driver display:
 - Maximum line speed
 - Speed set out
 - Prescribed distance
 - Braking curve
- Supervision:
 - Line speed
 - Speed restrictions
 - Stops
 - Dynamic braking curve
- Reaction:
 - Optical warning
 - Acoustic warning
 - The emergency brake is activated in the event of the elusion of any traffic supervision and in the event that the driver does not intervene after a warning acoustic signal

3) BACC (Italy)

The Codified Currents Automatic Block (BACC) is installed over all the lines where the admitted speed is over 200 km/h in FS network and on others lines which are the greatest part of those considered to carry out interoperability.

The system is made up of codified track circuits that work at 2 carrier frequency in order to manage two class of train. On board equipments are informatics.

Data transmission between coded tracks circuits and on board equipment has carried out through inductive coupled aeriels located over the rails.

Main characteristics

Data transmission to trains:

- Carrier frequency 50 Hz
 - Speed codes AM modulated
 - 5 Speed codes AM modulated

- Carrier frequency 178 Hz
 - Speed codes AM modulated
 - 4 speed adjoined codes
- On board 2 different types of trains can be selected (Speed code detected on run)
- On driver display :
 - Speed corresponding to the speed code
 - Meaning of the signal
- Supervision:
 - Speed(continuous)
 - Stops
- Reaction:
 - Emergency brake in the event of over speed

4) Crocodile (Belgium, France, Luxemburg)

It is installed on the main lines of RFF, SNCB e CFL.

Crocodile works on all lines taken into consideration in order to interoperability.

The system is based on an iron bar placed in the middle of the rails put in physical contact with a brush on board of the train. The bar carries a voltage of +/- 20V dc on the base of signal meaning.

There is a warning and the driver must recognize it. If he does not that an automatic braking starts.

Crocodile does not control speed or distance: It takes only a supervision action

The on board and ground unities are of conventional type

Main features

- Bar fed at +/- 20V dc
- Any train characteristic on board
- Supervision:
 - recognition by the driver
- Reaction:
 - the emergency brake is activated in the event that the driver does not recognise after a warning acoustic signal

5) Ebicab (Sweden, Norway, Portugal, Bulgaria)

There are two versions of Ebicab: Ebicab 700 ed Ebicab 900.

Description of Ebicab 700:

ATP "fail-safe" standard system in Sweden, Norway, Portugal, Bulgaria.

Same software in Sweden and Norway that allows trains running across the two State to cross the borders without drivers and locomotives change in spite of the difference of signalling and regulations.

Different software is used in Portugal and Bulgaria.

The system is made of ground equipments, transponders and signal codifiers with electronic apparatus and computer equipments on board.

The data transmission is between passive (not fed) balises located on the tracks (2-5 for each signal) and one aerial on board located under the vehicle which feeds also the balise on its transit.

The balise and the on board aerial are inductive coupled.

Main features

- Balises:

- 27.115 MHz
- AM(synchronisation impulses)
- Impulses frequency: 50 kHz
- Data transmission to trains:
 - 4.5 MHz
 - 50 kb/s
 - 12 bit available on 32 total2
- Link
 - Signals are connected
 - Panels connection is not necessary (for instance warning and speed panels are not connected)
 - 50% of not connected balises is acceptable in order safety conditions
- Train characteristics as follow can be set by the driver :
 - Maximum train speed
 - Train length
 - Train braking features
 - Special train characteristics to allow either over speed or speed restriction on some sections
- On driver display:
 - Maximum line speed
 - Set out speed
 - Information in order to signal distance to cover and speed to respect: 5 block sections can be supervised
 - Speed restriction besides first signal.
 - Service braking time : three warnings
 - Failures of track and on board equipments
 - Value of last late
 - Pressure inside brake tube
 - Information about last overcome balise
 - Auxiliary information
- Supervision:
 - Line speed on the base of track and train characteristics
 - Putting into effect speed restrictions for special trains
 - Multiples aims
 - Permanent, temporary or emergence speed restrictions can be activated with disconnected balises
 - Stops
 - Dynamic braking curve
 - Condition of control equipment of level crossing and landslide
 - Signal to stop, 40 km/h is supervised as far as the main successive signal
- Reaction:
 - Acoustic warning signal when train overcome of 5 km/h maximum speed, service brake when train overcome of 10 km/h maximum speed.
 - Service brake can be released by the driver when the speed comes back in set limits.
 - Emergency brake is utilised only in the event of real emergency for instance when service braking is not enough.
 - Service brake can be released only when train has stopped.
 - Ebicab brake in a way independent enough from driver intervention

- Options put into effect:
 - Block radio system “ ETCS level 3 type ”
 - Ground- train communication

Description of Ebicab 900:

The system is made of ground equipments, transponders and signal codifiers with electronic apparatus and computer equipments on board.

The data transmission is between passive (not fed) balises located on the tracks (2-4 for each signal) and one aerial on board located under the vehicle which feeds also the balise on its transit.

The balise and the on board aerial are inductive coupled.

Main features

- Balises:
 - 27 MHz
 - AM(synchronisation impulses)
 - Impulses frequency: 50 kHz
- Data transmission to trains:
 - 4.5 MHz
 - 50 kb/s
 - 255bit
- Link
 - Signals are connected
 - Panels connection is not necessary (for instance warning and speed panels are not connected)
 - 50% of not connected balises is acceptable in order safety conditions
- Train characteristics as follow can be set by the driver :
 - Train identification
 - Maximum train speed
 - Train length
 - Train braking features
 - Train speed type (only if speed is from 140 and 300 km/h)
- On driver display:
 - Maximum line speed
 - Set out speed
 - Over speed
 - Efficiency
 - ASFA warning
 - Brake realize
 - Circulation beside allowed limit
 - End
 - Warning acoustic signal
 - Brake notice
 - Red pilot light
 - Alphanumeric Monitor
- Supervision:
 - Line speed on the base of track and train characteristics
 - Putting into effect speed restrictions for special trains
 - Multiples aims
 - Permanent, temporary or emergence speed restrictions can be activated with disconnected balises

- Stops
- Dynamic braking curve
- Condition of control equipment of level crossing and landslide
- Signal to stop, 40 km/h is supervised as far as the main successive signal
- Reaction:
 - Acoustic warning signal when train overcome of 3 km/h maximum speed, service brake when train overcome of 5 km/h maximum speed.
 - Service brake can be released by the driver when the speed comes back in set limits.
 - Emergency brake is utilised only in the event of real emergency for instance when service braking is not enough.
 - Service brake can be released only when train has stopped.
 - Ebicab brake in a way independent enough from driver intervention

6) Indusi/PZB (Austria, Germany) (Induktive Zugsicherung/Punktförmige Zugbeeinflussung)

ATP system which works on all lines of Austria and Germany taken into consideration in order to interoperability.

Resonant circuits magnetically coupled ground-on board transmit 1 information of 3 to the train.

As far as safety is concerned the system is not “fail-safe” but safe enough to develop suitable supervision of the driver. It does not show him signalling conditions but only that train is supervised.

Main features

- 3 frequencies
 - 500 Hz
 - 1 000 Hz
 - 2 000 Hz
- Train characteristics that can be settled by the driver:
 - Braking characteristics (percentage and braking type for 3 categories of supervision)
- Supervision:
 - Hardware Version(not for Germany):
 - 500 Hz: Immediate speed supervision
 - 1 000 Hz: Recognition of the restrictive signal meaning, speed supervision depends on train type
 - 2 000 Hz: Immediate stop
 - Microprocessor version:
 - 500 Hz: Immediate speed supervision and then supervision of the braking curve
 - 1 000 Hz: Recognition of the restrictive signal meaning, speed supervision depends on the program with different braking curves, supervision by limited time and speed values for a limited distance; braking curves(on time and distance) activated by 1000 Hz
 - 2 000 Hz: Immediate stop
- Reaction:
 - The emergency brake is activated in the event of the elusion of any traffic supervision and in the event that the driver does not intervene after a warning acoustic signal.

- Emergency brake can be realized only on special conditions

7) KVB (France)

Standard ATP system in France on RFF network. Technically similar to Ebicab. In part installed on high speed lines in order to put in action some kinds of transmission and the supervision of temporary speed restrictions whose speed level are not supplied by TVM codes.

The system is made up with balises located along the track and include encoders and on board computer equipments. The system is overlaid on conventional signalling equipments. The data transmission is between passive (not fed) balises located along the tracks (2-4 for each signal) and one aerial on board located under the vehicle which feeds also the balise on its transit.

The balise and the on board aerial are inductive coupled.

Main features

- Balise
 - 27.115 MHz
 - AM(synchronisation impulses)
 - Impulses frequency: 50 kHz
- Data transmission to trains:
 - 4.5 MHz
 - 50 kbit/sec
 - 12 bit analogical available
 - 172 bit digital available
- Except block trains train characteristics must be set by the driver:
 - Maximum train speed
 - Train length
 - Train braking features
 - Train speed type
- On driver display:
 - Supervision of the speed
 - speed of the realise of the braking
- Supervision:
 - Line speed
 - Stops
 - Dynamic braking curve
 - Speed restrictions
- Reaction:
 - Warning to the driver. Emergency brake is activated in the event of the elusion of any traffic supervision. Emergency brake can be realised only when train stops.

8) LZB (Germany, Austria, Spain) (Linienförmige Zugbeeinflussung)

ATC system installed in Germany on all lines which overcome 160Km/h and are significant parts of the lines considered in order to interoperability.

LZB is also installed on some lines in Austria and in Spain

The system is built up of round sections which present:

- adaptation to the interlockings systems and transmission of relevant data
- data elaboration and Man Machine Interface (MMI) in LZB central place

- Data transmission to/from other LZB central places
- Data transmission to/from trains

On board equipments hold an integrated Indusi function. Data transmission between round and on board equipments is possible through a round inductive cable loop and a aerial on board.

Main features.

- Data transmission to trains
 - 36 kHz \pm 0,4 kHz (FSK)
 - 1 200 Bit/sec
 - 83,5 positions per telegram
- Data transmission to trains
 - 56 kHz \pm 0,2 kHz (FSK)
 - 600 Bit/sec
 - 41 positions per telegram
- Train characteristics can be set by the driver :
 - Maximum train speed
 - Train length
 - Train braking features
- On driver display:
 - Valid operational way
 - Data transmission conditions
 - Maximum allowed speed
 - Set out speed
 - Distance to the goal
 - Auxiliary indications
- Supervision:
 - Line speed (maximum speed, permanent, temporary or emergence speed restrictions)
 - Train maximum speed
 - Stops
 - Run way
 - Dynamic speed curve
 - Auxiliary functions
- Reaction:
 - Emergency brake is activated in the event of the elusion of any traffic supervision.
 - Emergency brake can be realised in case of overspeed when the speed comes back under settled limits Operational regulations of LZB system:
 - DB use LZB as an ATC fail-safe system; signalling along the way are not required, in the case they there are as trains not equipped shall circulate, they are invalid for train managed by LZB

9) SELCAB (Spain)

ATC system is installed on Madrid-Siviglia high speed line as extension of LZB in stations areas. The on board equipments LZB 80 (Spain) can manage also SELCAB data. Data transmission between on board and round equipments is by mean a semi-continuous cable loop on round and ferrite aerial on board.

Main features

- Data transmission to trains:

- 36 kHz \pm 0,4 kHz (FSK)
- 1 200 Bit/sec
- 83,5 positions per telegram
- Train characteristics that can be set by the driver:
 - Maximum train speed
 - Train length
 - Train braking features
- On driver display:
 - Maximum allowed line speed/ present speed
 - Settled speed
 - Distance from goal
 - Auxiliary indications
- Supervision:
 - Line speed
 - Stops
 - Run way
 - Dynamic braking curve
 - Dynamic braking curve
- Reaction:
 - Emergency brake is activated in the event of the elusion of any traffic supervision.
 - Emergency brake can be realised in case of overspeed when the speed comes back under settled limits

10) TBL 1/2/3 (Belgium, U. K.)

TBL is an ATC system installed on NMBS/SNCB lines

The system is made up with balises along the track near each signal and with a on board equipment.

TBL1 is a warning system, TBL2/3 is a cab signalling system.

TBL2/3, foresees balise "in-fill " and also a cable in-fill loop.

The ground section is called TBL2 in the case it interfaces relay interlocking systems and TBL3 in the case it interfaces a computer based system. The on board equipment is called TBL2 and includes TBL2, TBL1 Crocodile functions

Data transmission is between active balises located along the track and same aerial located on board

Main features

- Data transmission to trains:
 - 100 kHz \pm 10 kHz (FSK)
 - 25 kbit/sec
 - 119 bit available for telegram(TBL2/3)
 - 5 data available on 40 bit for telegram (TBL1)
- Train characteristics as follow can be set by the driver (TBL2)
 - Train identification and language selection
 - Maximum train speed
 - Train length
 - Train braking features
- On driver display:
 - Maximum speed (braking curves)
 - Set out speed
 - Present speed

- Maximum allowed line speed/ present speed
- Settled speed
- Distance from goal
- Auxiliary indications
- Supervision:
 - Line speed on the base of track and train characteristics
 - Putting into effect permanent and temporary speed restrictions
 - Multiples aims
 - Dynamic braking curve
 - Stops
 - Way of run
 - Driver supervision
 - Auxiliary functions
- Reaction:
 - Acoustic and optic warning signal
 - Emergency brake is activated in the event of the elusion of any traffic supervision

11) TPWS (U.K.)

TPWS system has the aim to improve safety, mainly in junctions. . TPWS may be installed to all the lines considered in order to interoperability.

The system insures following functions:

- Warning to the driver at the normal braking distance in the event of following restrictive conditions
 - Not open signals
 - Permanent speed restrictions
 - Temporary speed restrictions
- Train protection on following circumstances
 - Overcoming line allowed maximum speed or special speed restrictions (speed restriction)
 - Excessive speed near a stop signal (speed restriction)
 - Overcoming a red signal (train stop).

The system is based on permanent magnets and coils which generate magnetic field on the track. The system is considered fail safe and includes measures and principles in order to minimize wrong behaviours of the driver.

12) TVM (France, Belgium)

TVM is installed on RFF high speed lines.

The older version (TVM 300) is installed on the line Paris-Lyon (LGV SE) and on the lines Paris-Tours/Le Mans (LGV A).

The most recent version (TVM 430) on Paris-Lille-Calais (LGV N) line, on the SNCB section towards Brussels, on the line Lion-Marseille/Nimes (LGV Méditerranée) and on Eurotunnel. TVM 430 version is compatible with TVM 300.

TVM 300 e TVM 430 are based on coded tracks circuits as continuous transmission tools and on loop or balises (type KVB o TBL) as means of discontinuous transmission.

Main features

- Data transmission to trains thought track circuits
 - Several carrier frequencies (1,7, 2,0, 2,3, 2,6) kHz
 - Speed codes FSK

- 18 speed codes (TVM 300)
- 27 Bit (TVM 430)
- Data transmission to trains through inductive loop:
 - TVM 300: 14 frequencies (from 1,3 to 3,8 kHz)
 - TVM 430: PSK signals, 125 kHz, 170 bit
- On driver display:
 - speed orders connected with coloured signalisations
- Supervision:
 - Speed (continuous)
 - Braking based on:
 - feet curve (TVM 300)
 - parabolic curve (TVM 430)
 - Stops
- Reaction:
 - Emergency braking is activated in the event of over speed.

13) ZUB 123 (Denmark)

Zub 123 is an ATC system widely installed on Danish lines considered in order to actuate interoperability. The system is made up as follows:

- Ground equipments:
- One transponder located outside track
- Sometimes utilised cable loop as infill
- On board equipments (considered fail safe):
- Unity of data elaboration, line coupling coils, odometer, tachometer, monitor in cab.

Main features

- 3 frequencies:
 - 50 kHz: control channel
 - 100 kHz: energy channel
 - 850 kHz: data channel
- Data transmission:
 - Time Division Multiplex (until 96 available bits)
 - Data computer elaborated
- On driver display:
 - Maximum allowed line speed/ present speed
 - Settled speed
 - Distance from goal
 - Auxiliary indications
- Supervision
 - Line speed
 - Stops
 - Speed restrictions
 - Dynamic braking curve
- Reaction:
 - Emergency brake is activated in the event of the elusion of any traffic supervision
 - Service brake can be released by the driver when the speed comes back in set limits.

14) EVM (Hungary)

EVM is installed on the main lines of Hungarian Railways (MAV). These line are taken in consideration in order to actuate interoperability .Most of locomotives are equipped. The ground equipments are made of coded block circuits which switch a carrier frequency for data transmission. The carrier frequency is 100% AM coded.

Data transmission between coded tracks circuits and on board equipment has carried out through inductive coupled aerials located over the rails.

Main characteristics

- Data Transmission track-trains
 - Carrier frequency: 75 Hz
 - AM codes (100%)
 - 7 codes (6 speed codes)
- On the driver display:
 - Aspect on board of the signal
 - Signalling aspects (stop, allowed speed reaching -15,40,80,120,max-notransmission/failure, shunting mode)
- Supervision:
 - Speed limit
 - Speed control each 1550 m in the event of $v_{real} < v_{set}$ out
 - Supervision control each 200 m in the event of $v_{real} > v_{set}$ out
 - Aspect relevant to stop
 - Speed restrictions
 - Shunting mode
- Reaction
 - Emergency brake is activated in the event of:
The driver does not intervene;
 - the speed limit is not respected after the supervision signal
 - the stop signal has been overcome at a speed superior 15 Km/h
 - in shunting mode after overcoming 40 km/h

15) LS (Czech Republic, Slovakia)

LS is installed on all the main lines of the Czech and Slovak State Railway (CD and ZSR). These line are taken in consideration in order to actuate interoperability.

The ground equipment are made of track coded systems.

The carrier frequency is 100% AM coded. Most of locomotives hold on board equipment, in part modernized (computer based)

Data transmission between coded tracks circuits and on board equipment has carried out through inductive coupled aerials located over the rails.

Main characteristics

- Train data transmission:
 - carrier frequency: 75 Hz
 - AM codes
 - 4 speed codes (included stop aspect)
- On driver display
- Aspect on board of the signal
 - Signalling aspects (stop, speed restrictions, attention –speed limit100Km/h, maximum speed)
- Supervision:
 - Speed limit

- No distance supervision
- Reaction:
 - Emergency brake is activated in the event of the driver does not intervene when speed limit is overcome

16) ZUB 121 (Switzerland)

Only in order to inform are described the main functionalities of the system utilised by Switzerland (European country not U. E. members).

It is the system widely installed on Swiss lines of SBB and BLS taken in consideration to improve interoperability

The system is made of:

- Line equipments
 - Establish the run direction on which the system intervenes
 - A transponder installed in the middle of the track decentralized compared with the coupling loop establishes the run direction on which the system intervenes
- On board equipment
 - Brake unit
 - Coupling coil installed on the bogie, which receives the data from the line
 - The odometer and the tachometer.
 - Cab panel and monitor.
 - An input / output interface to radio installed on the train in order to transmit data inserted by the driver.
- Characteristics
 - 3 frequencies:
 - 50 kHz: check channel
 - 100 kHz: energy channel
 - 850 kHz: data channel
 - Data transmission
 - Multiplex time sharing.
 - Data elaboration on board not "fail-safe"
 - On driver display:
 - Any control
 - Signal : go from a loop
 - Maximum allowed line speed/ present speed
 - Settled speed
 - Emergency brake on
- Realise bottom
- Supervision:
 - Speed limit
 - Speed control each 1550 m in the event of $v_{real} < v_{set}$ out
 - Supervision control each 200 m in the event of $v_{real} > v_{set}$ out
 - Aspect relevant to stop
 - Speed restrictions
 - Shunting mode
- Reaction
 - Emergency brake is activated in the event of:
The driver does not intervene;
 - the speed limit is not respected after the supervision signal
 - the stop signal has been overcome at a speed superior 15 Km/h
 - in shunting mode after overcoming 40 km/h

- Supervision:
 - Speed lines
 - Stops
 - Speed restrictions
 - Dynamic brake curve
 - Radio channels control
- Reaction:
 - Brake is activated when the train gets the speed limit

Annex 10.1.4 ERTMS/ETCS CHARACTERISTICS

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1. Introduction

The unified control/command and signalling subsystem (ERTMS — European rail traffic management system) comprise two elements:

- the control/command and signalling element (ERTMS/ETCS — European rail traffic management system/European train control system) covers both the onboard subsystems and track-side subsystems,
- the radio and telecommunication element (ERTMS/GSM-R — GSM for railways) is based on the standards applied to the public GSM network and also covers both track-side and onboard equipment. GSM-R is based on ETSI standard GSM phase 2+, including GPRS (global packet radio services), extended to railway-specific applications.

The basis for the control-command and signalling subsystem shall be the set of specifications Listed on the tables annexed to the COMMISSION OF THE EUROPEAN COMMUNITIES DECISION n°2004/447/EC dated 29 April 2004.

These specifications will be still revised in particular taking into account the fact that a consolidation phase is necessary for the ERTMS specifications, based on the trial sites and the first implementations.

In the following chapters, of the system approved by the UIC-railways, we summarize:

- objectives ,
- general description,
- main operational functions.

2. ETCS Objectives

The trend toward liberalization in the transport world means that in future the railways are going to have to compete even more intensively with other modes of transport. The ETCS system, therefore, is intended not only to improve operating efficiency, but also to seize every opportunity to reduce acquisition and maintenance costs.

The adoption of a uniform system at a European level will result in cost reductions, as system development and maintenance can be carried out in a uniform manner.

Furthermore, the fact that all the railways will be using the same system means that the system components can be produced in larger quantities.

However, it is necessary:

- that the railways are not dependent on individual suppliers who may acquire a monopoly position; rather, the railways must be able to acquire their equipment from a selection of competing suppliers.
- whenever possible, it is necessary to move away from railway-specific standards and designs

All railways have to be able to provide market-oriented, reliable, safe and cost-effective train transportation for both passengers and freight. One of the prerequisites for this is to have an

appropriate system for train control and protection (ATC), which consists of fixed installations and of equipment installed on board the trains themselves and allow rational train operations with a minimum of on-board personnel.

One consequence of the absence of a standardized ATC system is that each railway follows its own programme for the development of ATC system components, both fixed and on the trains.

The utilisation of different ATC systems means that either locomotives have to be changed at borders or traction units have to be equipped with multiple ATC systems.

The former solution leads to unnecessary delays at borders and a requirement for a large number of locomotives, personnel and sidings for changing locomotives.

The disadvantage of the latter solution is that a particular international route can only be operated with traction units which are tailor-made to the ATC infrastructures along that route.

This limits the interchangeability of traction units. Furthermore, the reliability of a "multiple ATC" system is lower than that of the systems normally used.

Therefore the absence of a common technical solution for international traffic does not meet the railways' long-term reliability and efficiency requirements.

ATC systems are currently undergoing a transition from simple "signal repetition" to becoming an integral part of a comprehensive control system.

More and more of the significant parts of systems which control and protect train traffic, such as points or signals will be computer-controlled.

Such computers may be on the ground or on board the vehicles and will be connected to one another by means of data transmission systems in order to meet the highest safety requirements.

Anyway one of the major difficulties in setting up new systems on the railways, as the ones on study, is that the ground equipment is designed to have a long lifetime and is used over a wide geographical area.

Because of this, some railways work for extended periods with several generations of signal equipment, some of which is technically outdated.

Besides for the lines on study, the second aim of the ATC systems (to increase the carrying capacity of the line by taking speed and headway to the limits of the physically possible) is not a priority.

3. ETCS General requirements

3.1 Basic way of functioning

A train control system must include a train protection system and must ensure that

1. a train does not exceed the limits of the route set and established for it
2. a train does not exceed the speed permitted on any part of the route.

The permitted speed of a train is determined by a number of influencing factors. These result from the prevailing track conditions (e.g. radii, gradients) and the structural properties of the vehicles working together. The permitted speed for a specific train is the result of the lowest speed profile which has been calculated based on the influencing parameters.

ETCS must ensure that a train will not exceed its speed limits. In general terms the margins for permitted speed are normally greater than really necessary and mainly related to comfort. The margins however vary according to the conditions, e.g. points in reverse position or temporary speed restrictions.

In addition, the effective braking conditions of the train must be taken into consideration. They determine both the transitions between the different speed levels at speed changing points and also the braking curve at the end of the set route.

At the end of movement authority of a train, the train speed permitted is zero. There exists therefore a closed profile of the nominal speed for the entire proved route section. The basic principle for any train control system is to ensure (by continually comparing nominal conditions with actual conditions) that the actual speed for a train only exceeds the permitted speed by a permitted tolerance.

On the networks of this study with train protection systems designed for use in conjunction with manual driving, the permitted speed profile is specified in written instructions and/or speed boards which are placed along the line.

Most of the work of comparing permitted and actual values is carried out by the driver. Technical monitoring is required in critical areas, such as the approach to a signal showing the danger aspect.

On the contrary with ETCS the permitted speed profile is calculated from the infrastructure data and train data for the entire route set and proved. The more data available, the more accurate use can be made of track geometry and track strength information.

ETCS is therefore a protection system with a capability of enhancement to automatic train control using conventional systems or moving block systems. It has components and functions designed specifically to meet signalling safety requirements.

3.2 Infrastructure installations

The aim of the infrastructure installations is to collect the data which must be transmitted to trains. This data includes information about the infrastructure, including the interlocking and the block.

Infrastructure data may also be used for trackside calculation of the permitted train speed which then is transmitted to the train.

A line or a part of a line can be equipped with either

- intermittent data transmission (uni-directional or bi-directional) or
- continuous data transmission (uni-directional or bi-directional)

When running on a line equipped with intermittent data transmission, transmission from track to train (and optionally from train to track) can only take place when the train is actually passing a transmission point (e.g. a balise or a short/medium loop).

When running on a line with continuous data transmission (e.g. long loop or continuous radio transmission), transmission from track to train and optionally from train to track can take place at any location.

The amount of data that has to be transmitted from a infrastructure installation can be reduced through the use of a route map, provided that this route map is regularly updated and controlled.

3.3 Trainborne equipment

Traction units must be equipped with a European Vital Computer (EVC) together with equipment for receiving information from infrastructure installations, equipment for speed measurement and equipment for data entry.

The EVC must be capable of:

- calculating the permitted train speed based on infrastructure data and train data or to receive (parts of) these information trackside calculated;
- supervising the train according to this permitted speed;
- dealing with several data bases containing equivalent subject matters.
- allowing the traction unit to run on lines equipped to different ETCS applications and in different countries.
- permitting the railways to gradually equip their network without changing the trainborne equipment.

The train borne equipment must provide an output to a recording system, which in principle must record all operationally significant changes in the ETCS train borne equipment.

3.4 Transmission

A train equipped with ETCS requires information to be passed from infrastructure installations to the trainborne equipment (e.g. track-to-train transmission).

Intermittent transmission may use balises or short/medium loops or radio.

Continuous transmission may use long loops or radio.

Continuous or intermittent transmission must be indicated to the driver.

The permitted speed profile must be updated depending on operational requirements. The static train speed profile data determined from track and train data, must be supplemented with information on the

occupancy state of the next route section. This can be supplemented by providing a route-dependent speed specification.

In principle permission for a train to run, once given, can only be extended. However, in the event that a movement authority is reduced or withdrawn (due to an emergency, signalman error, signalling failure, etc.) the intervention of ETCS is dependent on:

- the type of transmission from track to train (intermittent or continuous)
- the location of the train in relation to the position of the new movement authority.

In the case of intermittent transmission a more frequent updating (and therefore an improvement in operating flow) can be achieved by setting up additional data transmission points.

The Radio Block Centre (RBC), whose function is to govern train separation has an interface with ETCS. The RBC receives the train's location from the train via radio and sends movement authorities to trains. The information transmitted is considered as safe data. The RBC may also provide functions applicable for a moving block system.

Centralized Train Signalling (CTS) uses the ETCS transmission to transmit movement authorities from interlocking or blocks to trains.

The train separation function will still be provided in the interlocking/block.

The static train speed profile must be capable of being calculated by the CTS and transmitted to the train.

3.5 Operation with existing national train control systems

ETCS must be compatible with existing national systems such that it does not interfere with the national system and is not interfered by the national systems.

The information from a national train control system is received via national trainborne transmission equipment and transformed into ETCS information via a Specific Transmission Modules (STM). The EVC will display the information to the driver on the MMI and control the train according to the national train control information.

It might, however, be possible to extend the functionality according to data available (e.g. train data) or certain data entered manually by the driver.

3.6 System Start Up and Data Entry

The ETCS trainborne equipment must be activated automatically when the driver opens the driving desk of the traction unit. When so activated, the equipment must activate various test procedures capable of determining whether the equipment is capable of operating safely and is fit for service. The design of the ETCS must ensure that, if the trainborne equipment is not capable of operating safely, the train traction unit cannot be used in service without first isolating that equipment.

After the test procedure the driver may select Shunting or Data Entry or a position which allows the vehicle to be transported inside a train.

3.7 Transition between operational status

The ETCS trainborne equipment must be capable of running in the following status:

1. Shunting
2. Partial Supervision
3. Full Supervision
4. National operation.

Any transition which occurs while the train is moving must in principle occur automatically. Transitions which occur while the train is stationary, may be initiated automatically or manually as appropriate. If, as a result of an automatic transition, the responsibility passes from ETCS to the driver, the ETCS must seek an acknowledgement from the driver, whether the train is stationary or not. If the driver fails to acknowledge as required, the ETCS must initiate a full service brake application. Any transition has to be recorded.

During the transition period between two operational states (including two different national operations) the supervision provided must at least ensure the same protection provided by the least restrictive states.

4. ETCS Main functions

4.1 Operational Functions

4.1.1 Trainborne Equipment Start Up and Test

This function is intended to detect failures in the trainborne equipment before the traction unit enters service.

The Start Up function shall make it possible for the driver to detect possible failures in the trainborne equipment before the traction unit enters service.

In the automatic self test, the ETCS trainborne equipment checks its configuration as far as possible. The trainborne equipment then proves the functions of the external devices, e.g. power supply, air pressure and brake application. It must be possible to test brake control without exhausting the brake pipe. If an RBC communication is available, the communication must be tested.

4.1.2 Train and driver data entry

This function is intended to provide data relevant to train supervision and the record of the driver identification

A safe method of data entry is automatic data entry. The media for this can either be balise, radio, loop, magnetic card, train computer, previously entered train data or other possibilities.

In this context the driver is not responsible for data entered automatically; the driver must only confirm that the data has been received, and understand the data that are necessary for operation of the train.

Manual data entry brings the risk of (hazardous) errors by the driver. The quantity of data to be entered should be minimized.

4.1.3 Shunting

This function is intended to enable an ETCS equipped traction unit to move for shunt purposes at low speed with the trainborne equipment switched on and without necessarily having train data. A minimum of supervision is provided.

An ETCS equipped traction unit must be capable of being moved in Shunting without train data, track data or movement authority.

Transfer to Shunting on driver's selection must only be possible when stationary. The selection must be recorded.

A shunting movement is not fully supervised by ETCS.

It provides supervision to the permitted speed for Shunting

In the event of passing a " limit for Shunting" signal when hauling, the ETCS train trip function will apply the emergency brake, but it must be noted that this emergency brake will not necessarily stop the shunting movement in rear of a danger point.

4.1.4 Partial Supervision

A train will operate in Partial Supervision when the trainborne equipment is switched on, train data is available but track-to-train information received is not sufficient for Full Supervision.

Partial Supervision must be selected from Data Entry or Partial Supervision information must be received from track-to-train transmission.

The driver must acknowledge transfer from Full Supervision to Partial Supervision within 5 sec. The acknowledgement must be recorded.

Partial Supervision must be indicated on the MMI.

In Partial Supervision the train must be supervised according to train speed data available. The train must have the capability of being supervised to one line speed level; this speed level must not be shown continually on the MMI but may be shown momentarily when selected by the driver.

Partial Supervision is used when a train is running on a non ETCS-equipped line. Partial Supervision is used on an equipped line until the first status selecting information is received.

Partial Supervision requires train data to be available. The train is supervised according to this train data, and the trainborne equipment is ready to receive track-to-train information when available.

If a railway wants to supervise to one speed level (the line speed) this speed level must be transmitted to the train. This speed level remains in force until Partial Supervision ends or new speed level information is received. Alternatively one speed level can be stored as a national value.

When the train moves from an equipped to a non-equipped line, information about Partial Supervision is transmitted automatically from track to train. This information could contain the line speed level for the non-equipped line.

When a train in Partial Supervision has passed a signal at danger the train trip function will apply. In this case it must be noted that the emergency brake will not necessarily stop the vehicles in rear of the danger point.

The national rules and regulations should provide the information necessary for the train to operate.

4.1.5 Full supervision

This function is intended to supervise the train to all speed limits and stop signals.

Transferring to Full Supervision must occur automatically from Data Entry or Partial Supervision when movement authority is received via track-to-train transmission.

Full Supervision must be indicated on the MMI.

Transferring to Full Supervision must be recorded.

Full Supervision must provide protection of train speed, line speed, movement authorities and supervision of train braking.

The trainborne equipment must remain in Full Supervision until the trainborne equipment is not active any longer, when Data Entry or Shunting is selected or when Partial Supervision information is received.

4.1.6 Compatibility with existing train control and protection systems

This function is intended to make the ETCS trainborne equipment compatible with existing national train control systems (see following list).

The ETCS trainborne equipment must be capable of receiving information from the national train control systems and, by means of the STM, translate this into ETCS information, thereby enabling the ETCS to run in the appropriate national operation

It is assumed that the ETCS-equipped traction unit must provide a special (national) antenna for receiving information from national train control systems and a special front-end module (STM) for translating this information into ETCS information.

National train control to be compatible with ETCS:

BLS:	SIGNUM
BR:	AWS, EAWS, ATP/ACEC, ATP/SELCAB
BV:	ATC
CD:	LS
CFL:	contact ramp
CP:	EBICAB 7xx
DB:	PZB (INDUSI), LZB,
DSB:	
FS:	BACC
GySEV:	EVM
HZ:	
MÁV:	EVM
NS:	ATB, ATBNG
NSB:	ATC-2
ÖBB:	INDUSI, LZB, SELCAB
PKP:	KHP
RENFE:	ASFA, LZB
SBB/CFF/FFS:	ZUB, SIGNUM
SJ/BV:	ATC-2
SNCB:	contact ramp, TBL
SNCF:	contact ramp, KVB, DAAT, TVM 300, TVM 430, KVBP, KCVP
SZ:	
ZSR:	
EUROTUNNEL:	

4.2 Infrastructure Functions

4.2.1 Infrastructure data collection

This function is intended to provide infrastructure data relevant to other functions.

Information about infrastructure that influences the running of the train must be transmitted to the trainborne equipment.

Emergency (not planned) speed restrictions and **temporary speed restrictions** must be capable of being easily applied.

The railways must be able to choose if the driver can enter data on the adhesion conditions.

Location, value and identifiers of speed levels, speed restrictions, gradients etc. are the input from:

- interlocking system, depending on the route proven
- route map
- updating of route map data.
- track-to-train transmission
- manual inputs

Temporary speed restrictions is treated as normal infrastructure data as they are capable of being planned as opposed to emergency speed restrictions.

To calculate the speed profiles, the train must be provided with data describing track geometry at least to the location where the relevant movement authority ends.

Speed restriction information shall provide, as output on MMI, speed levels for different kinds of trains, even on lines without curves, and state how to respect this information. A speed restriction shall therefore contain a train class identifier.

Infrastructure data can be held in a special trainborne route map. This minimizes the requirement for track-to-train transmission.

It is possible to send more or less data describing speed profile and track geometry to the train. If more data is sent, a more optimal speed profile can be calculated.

Traditionally this information already exists on the railways in the form of a route book or similar rules and regulations for the driver.

4.2.2 End of movement authority

This function is intended to determine how far the train is permitted to run.

The ETCS trainborne equipment must identify the end of movement authority of the train.

The location of the end of movement authority must be indicated on the MMI.

The time-out for the current movement authority must be transmitted to the train.

When the time-out for the current movement authority has elapsed, the train must pass into Partial Supervision and the reason indicated to the driver. The driver must acknowledge this transition. The train must continue to be supervised to speed restrictions and to stop at the next stop signal capable of transmitting ETCS information.

End of movement authority is normally a main-signal showing "danger" or the rear end of the preceding train or any location to which the train is permitted to proceed and where the target speed is equal to zero. It does not include the overlap or the safety distance in advance of the signal.

From the end of movement authority the dynamic train speed profile is calculated "backwards" against the direction of the train.

A similar procedure is used in the event of the static train speed profile changing to a low speed level; in this case the dynamic train speed profile borders on the point, in which the speed decreases.

4.3 Trainborne Functions

4.3.1 Static train speed profile calculation

This function is intended to calculate the static train speed profile based on train data and infrastructure data.

ETCS must collect all relevant information concerning train and line speed.

ETCS must calculate the permitted speed for the train for all locations on the line. This static train speed profile must also respect maximum line speed and track speed and special speed levels for special classes of trains.

If the static train speed profile decreases, the train speed must be reduced to the lower value before the leading vehicle passes the point of decrease.

The ETCS trainborne equipment calculates the static train speed profile on the basis of infrastructure data and train data. Alternatively (parts of) the static train speed profile may be calculated in the CTS and transmitted to the train via track-to-train transmission.

The static train speed profile changes in steps and does not consider the acceleration/ deceleration of the train.

The static train speed profile does not consider the maximum safe speed for the track or the train.

In the simplest case, the static train speed profile is the lower of the maximum track speed or the lowest speed of any vehicle of the train.

If detailed data is available and if the train contains a special class (e.g. a tilting train), a special static train speed profile which can be optimized according to all parameters is calculated.

4.3.2 Dynamic train speed profile calculation

This function is intended to calculate train braking curves which will respect any limitation applying to the train.

Based on static train speed profile, end of movement authority, gradients, adhesion and deceleration parameters, the ETCS must calculate a full service braking curve and an emergency braking curve.

Changing to a lower speed level, the front end of the train must respect the dynamic train speed profile.

Both the full service and emergency braking curves must be calculated from the target.

The command of emergency brake by ETCS must be fail safe. The use of the braking curves is to ensure the train complies with its speed requirements.

The braking curves are calculated "backwards" from the target against the direction of the train.

Where failure to apply the full service brake is detected the emergency brake must stop the train in rear of the danger point.

4.3.3 Release speed calculation

This function is intended to calculate a release speed for a train approaching the end of its movement authority.

Based on:

- safety distance and overlap
- accuracy of odometry
- deceleration performance of the train

a release speed must be calculated to allow the train to approach the target. The release speed must ensure that the train will stop before reaching the danger point . The release speed must be indicated on the MMI.

The release speed calculation makes use of the safety distance and overlap which most railways use. The release speed shall allow the train to approach the signal at maximum safe speed. If the signal has cleared, new information will be received. If the signal is still at "danger", the train trip function will apply and stop the train in rear of the danger point.

4.3.4 Train location

This function is intended to determine the train location in accordance with its movement authority and thus to the supervision of the train.

The ETCS trainborne equipment must be able to determine the location of the entire train.

On lines fitted with RBC, the ETCS trainborne equipment must be able to transmit the location of the entire train to the RBC.

The train location calculation must take into account error of odometry and the Input of Train integrity
Output

On lines with traditional interlocking/block facilities, Train location is an ETCS external function provided by track circuits/axle-counters. Train location detection can only be guaranteed to the accuracy of train detection unit(s).

To be able to supervise a train with respect to a braking curve, taking into account the actual braking performance, the ETCS trainborne equipment must know the location of the train relative to the target.

The train location function must therefore be an ETCS internal function provided by the ETCS trainborne equipment and based on distance travelled from the last reference point.

On lines fitted with RBC, the location of the entire train must be transmitted from train to RBC. The procedure is as stated above but must include the train length.

Since the train location function is derived from information received via balises and on the measured distance from these reference points, the train location function requires a safety margin in order to compensate for the inaccuracy of the odometry.

Generally the railways will get the highest benefit from the ETCS and in particular the RBC by using accurate odometry.

If a railway chooses to use normal level of odometry it must realize, that in the event of intermittent transmission and e.g. 1000 m between the balises an extra safety margin of 50 m must be considered to maintain safety. This margin might reduce the effective length of a certain station track.

A cost-benefit-analysis might force the railways to use existing safety distances and overlaps or they may use infill information to compensate for the inaccuracy of the odometry.

4.3.5 Speed calculation and indication

This function is intended to calculate actual speed and indicate it to the driver.

Actual speed must be indicated on the MMI. If the ETCS trainborne equipment is out of service a special speed indication must be provided.

The error of the speed measurement must not exceed a value chosen by a railway and transmitted to the train as infrastructure data.

It must be possible for the railways to require a level of accuracy.

Actual speed must be recorded so as to establish how the train or the shunting movement has been driven.

4.3.6 Indication on the MMI of movement authorities and speed limits

This function is intended to indicate to the driver the calculations made by other functions.

Visual indications to the driver must be clear and visible and under all conditions.

Audible indications must be capable of being heard in the driver's cab environment.

The indication provided must enable the driver to drive at the permitted speed without receiving a warning and without intervention of ETCS.

The driver must know the distance to the point to which he is permitted to move and the permitted speed allowed. This must be shown to the driver in a way that is understandable and logical.

Visual and acoustic warnings to the driver about possible intervention from ETCS must be given to enable the driver to react and avoid intervention.

4.3.7 Supervision of movement authorities and speed limits

This function is intended to assist the driver in reacting correctly and to define criteria for warning and intervention if the driver fails to respect movement authorities and speed limits.

A train must be supervised to its static and dynamic train speed profiles.

A warning must be given to the driver to enable him to react and avoid intervention from ETCS equipment at least 5 sec. before the intervention of the full service brake. Also the actual acceleration must be taken into account. If it is impossible to calculate this time (e.g. approaching the permitted speed level very slowly), the warning must be given when the train or the shunting movement exceeds the permitted speed by 5 km/h. The warning must continue until actual speed does not exceed permitted speed

If the train or the shunting movement exceeds the permitted speed by 10 km/h or more the trainborne equipment must execute a full service brake application until the actual speed does not exceed permitted speed; then the driver must be capable of selecting release of full service braking. The full service brake intervention must be recorded.

4.3.8 Supervision of driver activity

This function is intended to replace the traditional vigilance functions.

When the traction unit is moving, the ETCS trainborne equipment must require a reaction from the driver within certain intervals (time and/or distance). These intervals must be capable of being defined as national values. The default value will be defined later.

In the event of no driver reaction being detected during the defined interval, the driver must be warned visually and acoustically. If the driver does not react within 5 sec. the trainborne equipment must command the emergency brake. The emergency brake may be released according to a national value.

When a train is in Full Supervision, the driver activity function must be capable of being suppressed by ETCS according to national values/rules.

The status of this function must be indicated clearly to the driver.

The application of the emergency brake and the isolation of the driver activity function must be recorded. When in Shunting and Partial Supervision, normally no braking curves are provided. In these cases this function is essential.

4.3.9 Recording the ETCS information

This function is intended to provide an interface to a trainborne recorder for investigation, assessment and maintenance purposes.

ETCS must provide an interface to a recording system.

ETCS trainborne equipment must transmit data entered, received and calculated to the data recorder. All data transmitted must be related to real time.

Actual speed and other information must be recorded to an accuracy which enables a clear view of the way the traction unit has been driven.

Interfaces must enable transmission of information recorded to other media for investigation, assessment and maintenance purposes. This extraction of data may be by direct extraction, by radio or by train-to-track transmission.

The ETCS status must be recorded for the following purposes:

ETCS is a safety system. To reconstruct a certain situation (e.g. accident, equipment performance, driver actions) all relevant ETCS data shall be recorded. It may also assist in assessing driver performance.

5. Glossary

The term:	means:
Absolute braking distance	The distance between a train following another train must be equal to or greater than the braking distance of the following train.
Acknowledge, Acknowledgement	New data/situation that the driver has to accept to avoid intervention.
Advisory information	Information indicated to the driver on the MMI to assist him in driving the train.
Axle counter	A method of “train detection”.Track mounted equipment counts the number of axles entering and leaving a track section at each extremity. A calculation is performed to determine whether the track section is “occupied” or clear.
Balise	Device used for intermittent transmission between track and train and/or train and track.
Banking	An additional traction unit at the rear end of the train, not coupled, supporting the train for moving up a hill, leaving the train on top whilst running.
Block	A method of controlling the separation between trains by dividing the line into sections with, normally, no more than one train in each section. The block can either be a fixed block or a moving block.
Braking curve	A speed-distance curve calculated from train and infrastructure data and deceleration parameters of the train.
Confirm, Confirmation	The driver’s approval/validation that new data/information must be taken into account by the system.
Continuous data transmission	Track-to-train or train-to-track transmission can take place continuously via long loop or radio. The information is dedicated by a unique ETCS identifier.
CTS	Centralized Train Signalling. movement authorities and possibly static train profiles are calculated in the CTS and transmitted to the train via ETCS.
Default value	Value stored in the ETCS trainborne equipment and used in the event of no other value being available.
Driving "on sight"	When passing a signal at Danger or making a wrong direction movement for which a signal is not provided, the Driver must: Proceed cautiously being prepared to stop his train or shunting movement short of any obstruction

Dynamic train speed profile

The speed-distance curve which a train may follow without violating the static train speed profile and the end of movement authority. This curve depends on the braking characteristics of the train and the train length.

Emergency brake As defined in UIC leaflet 541-03. May be released by the driver according to a national value (not applying to train trip)

Emergency speed restriction

An unplanned speed restriction generated by an unforeseen temporary condition (e.g. a landslide)

End of movement authority

Location to which the train is permitted to proceed and where target speed = zero.

Equipped line Trackside ETCS equipment installed to provide Full Supervision .

EVC European Vital Computer. The trainborne, fail safe, ETCS computer. Calculates the speed profiles and supervises the train accordingly.

Exit signal Main signal, intended for trains leaving a station.

Fixed block A block in which the extremities of the block sections are fixed. The signalling allows a train to move from one block to the next, normally only when the block ahead is clear.

Full service brake As defined in UIC leaflet 541-03. May be released by the driver at any time.

In advance of B is said to be in advance of A if a train would pass A before B in the direction of travel.

Infill information Data which is transmitted from track-to-train at locations other than at main signals. Provides, for example, the ability to inform a train that the signal ahead has cleared.

In rear of A is said to be in rear of B if a train would pass A before B in the direction of travel.

Interlocking Trackside safety system for trains running in stations.

Intermittent transmission

Track-to-train or train-to-track transmission which can only take place when the train passes the information point (balise or short/medium loop or radio area)

Intervention Where ETCS takes control from the driver by
- cutting traction power (as an option)or
- applying the full service brake and cutting power or
- applying the emergency brake and cutting power.

Loop	Device for data transmission between track and train and/or train and track. May be a short loop, a medium loop or a long loop.
Main signal	A fixed signal intended for train movements, capable of showing a "danger" aspect and one or more "proceed" aspects. In some cases main signals at "danger" are valid also for shunt movement.
MMI	Man Machine Interface. The trainborne device indicating ETCS information to the driver and used by the driver for operating ETCS.
Movement authority	Permission for a train to run to a specific location within the constraints of the infrastructure.
Moving block	A block in which the extremities of the block sections are continually adjusted according to the position of the occupying train.
Multiple	Two or more traction units in service, mechanically and electrically coupled, which are operated by one driver.
National values	Values transmitted to a train when entering another administration related to the rules and regulations of this administration.
Non-equipped line	No trackside ETCS equipment installed or installed only for Partial Supervision .
Odometry	Used for speed measurement and distance measurement.
Overlap	Part of an entrance route located after the end of the route and locked as the route. The overlap must not be released until the train has stopped.
Pantograph	Device for transmitting power from overhead wire to the train.
Permissive signal	A signal aspect or a signal identification, which enables a main signal to be passed at "danger" under special conditions, without specific permission from signalman.
Permitted speed	The speed limit at which a train is allowed to proceed without ETCS warning and/or intervention.
Propelling	A train movement, in which the driver is not situated in the leading vehicle; propelling forward the master switch in the operative cab is in Forward for this operation; propelling reverse the master switch in the operative cab is in Reverse for this operation.
Railway management system	Administrative data base outside the scope of ETCS. From this data base ETCS may provide information for train supervision as well as for advisory purposes.
RBC	Radio Block Centre. A centralized safety unit to establish and control Train separation. Receives location information from all trains and generates movement

authorities to all trains. May provide an interface to interlocking systems for (partial) control of interlocking and indications from interlocking. Provides a train control possibility.
The ETCS data radio channel used is a safe data transmission channel not intended for spoken communication.

Reference point	Information point used for train location updating. Used to correct error of odometry.
Relative braking distance	A train following another in less than absolute braking distance of the following train.
Release speed	A speed value calculated by the ETCS trainborne equipment to allow a train to approach the end of its movement authority in a safe way. Needed for intermittent transmission to enable the train to approach a signal that has cleared in order to reach the information point at the signal.
Route	Track section prepared for train operation.
Route map	A data base providing infrastructure data required for train operation.
Safety distance	Distance between the end of a movement authority and the first possible danger point.
SDS	ETCS System Design Specification document.
Shunt hauling	A shunting movement, in which the driver is situated in the leading vehicle. Hauling forward the master switch in the operative cab is in Forward for this operation. Hauling reverse the master switch in the operative cab is in Reverse for this operation.
Shunt propelling	A shunting movement, in which the driver is not situated in the leading vehicle.
Shunting movement	When vehicles are moved without train data available.
Shunting signal	A fixed signal intended for shunting movements. In some cases Shunting signals at "danger" are valid also for train movements.
SRS	The ETCS System Requirements Specification document.
Static train speed profile	Speed profile calculated by ETCS. Respects train speed data, infrastructure speed data, including temporary and emergency speed restrictions, and movement authorities from interlocking and block systems.
Station	Where there can be points (facing or trailing) that makes it possible for the train to use different routes.

STM	Specific Transmission Module
Stop signal	Position, from where no movement authority is given to a train, not necessarily a fixed signal.
SSRS	The ETCS Sub-System Requirements Specifications (e.g. ETCS cab, ETCS balise, ETCS radio)
Tandem	Two or more traction units, mechanically but not electrically coupled together, used in the same train. Each traction unit requires a separate driver.
Target	Location where any ETCS information changes or intermittent transmission is expected.
Temporary speed restriction	Speed restriction on behalf of planned, temporary conditions, e.g. track maintenance.
Traction unit	Vehicle from where a train is operated.
Track circuit	Trackside device used for track free/occupied tion.
Track free	Determination of a track section not occupied by any railway vehicle. Determination is traditionally based on track circuits or axle counters, but may on ETCS equipped lines be replaced by Train location and Train Integrity functions.
Track occupied	Track occupied by railway vehicle(s). Determination is traditionally based on track circuits or axle counters, but may on ETCS equipped lines be replaced by train location and train integrity functions. Because of the fail safe construction track occupied could mean: track not determined free.
Track-to-train	Transmission of ETCS information from any trackside transmission equipment to a train via balise, loop, radio or other media. Using intermittent transmission (balise (or short loop) the information can only be transmitted to a train passing the transmission unit.
Train	A traction unit with or without coupled railway vehicles or a train set of vehicles with train data available.
Train data	Data that characterises a train and which is required by ETCS in order to supervise a train movement .
Train memory	Tables in the trainborne ETCS equipment for the countries to be selected according to national rules.
Train movement	When vehicles are moved with train data available, as a rule from station to station, and as a rule under the authority of "proceed" aspects from main signals, or similar procedures.

Train-to-track transmission	Transmission of ETCS information from a train to any trackside equipment via balise, loop, radio or other media.
Train trip	Is used when a train passes a "danger" signal, excluding any occasion when a suppress facility is used, and causes an immediate application of the emergency brake.
Warning	Audible and/or visual indication to alert the driver to a condition which requires a positive action by the driver.

6.Acronyms

BTM	: Balise Transmission Module.
LTM	: Loop Transmission Module.
RTM	: Radio Transmission Module.
STM	: Specific Transmission Module.
MMI	: Man Machine Interface.
OF	: Odometric Functions.
TIM	: Train Interface Module.
SSP	: Static Speed Profile.
LOA	: Limit Of Authority
EOA	: End Of Authority
SMS	: STM Management System
AST	: Active STM Table.
SCC	: Safe Control Command Functions (ETCS Kernel)
PAST	: Priority & Active Systems Table (Management Table)
ETCS	: European Train Control System
ERTMS	: European Railway Traffic Management System
SMM	: System Management Module
OSF	: Operational Switching Functions
SMF	: STM Mode Management Functions
EMF	: ERTMS/ETCS Mode Management Functions
PRF	: Physical Redundancy Management Functions

Annex 10.3.1 Example of Operational instructions

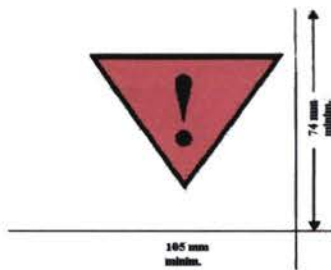
DANGEROUS GOODS

Example of Operational instructions

Notions about wagons with shunting restriction or placing out needs

Art. 1

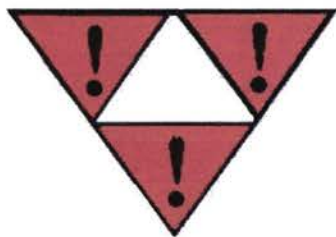
Labels of shunting restriction



M. 249 (n. 13 RID) wagons that can be shunted pushing with caution, avoiding in any case crushes at speed superior than 7 Km/h



M. 249 bis: wagons that can be shunted without particular restrictions even if with caution avoiding, in any case, bumps



M.249 ter (n. 15 RID): wagons that can be shunted only with accompaniment of the hooked engine caution avoiding, in any case, bumps



M. 250:shuntig with no allowed transit on throw saddle

Art. 2

Transport of dangerous goods

1. Materials and objects which by their nature can compromise train safety or harm the staff, damage other goods or railways equipment are defined dangerous goods.
2. The dangerous goods can be forwarded with passenger train only by order of the movement inspector applying the appropriate Instruction.
To forward with goods trains more wagons holding radioactive or explosive materials movement inspector must give specific orders on the basis of the appropriate Instruction.
3. On the wagons loaded with dangerous goods the labels of danger foreseen with reference to the load, nature must be attached. On the tank wagons or carrying tanks holding such goods must be always attached the label orange coloured with the identification numbers of the danger and of the material.
4. In case of a failure to a wagon holding dangerous goods must be immediately warned the movement inspector indicating the labels of danger attached and in case of tanks the identification numbers of the danger and of the material written on the label orange coloured.
5. It is forbidden to approach the wagons loaded by explosives, gas, flammables smoking or carrying free flames.
6. It is forbidden to introduce into the maintenance shops wagons still loaded with dangerous goods.

Art. 3

Danger labels, shunting restrictions, spacing out

1. Danger labels- meaning:

N° 1



N° 1.4



N° 1.5



Subject to explosion

N° 01



Danger of explosion

N° 2



Not flammable not toxic gas

N° 2



N° 3



Danger of fire

Liquid inflammable materials

N° 3



**Danger of fire
(flammable firm)**

N° 4.1



**Spontaneous
flammable**

N° 4.2



**Danger of flammable gas
in case of water contact**

N° 4.3



N° 4.3



N° 5.1



Oxidizing substances

N° 5.2



Organic peroxides

N° 0.5



**Danger of fire
activation**

N° 6.1



Toxic material

N° 6.1A



**Harmful
material**



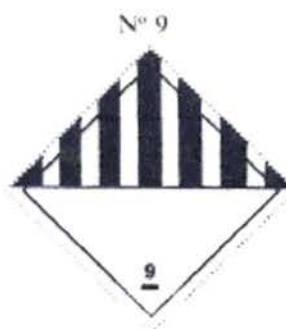
Materia radioattiva



Note: the wagons loading radioactive goods usually show the label n. 7 or one among the labels n. 7A,7B, 7C that, as far as shunting movements and spacing out are concerned, have the same meaning



corrosive material



materials that present a danger different from those shown on the other labels

2. Shunting restrictions

For wagons with danger labels n° 1, 1.5, 7D, 15 are forbidden pushing and gravity shunting and the movements must be effectuated only by engine connection and without any bump. For wagons with danger labels n° 1.4, 3, 4.1, 4.2, 4.3, 5, 13 are allowed pushing and gravity shunting on condition that are effectuated with caution avoiding, in any case, bumps at a speed higher than 7 km/h.

3. Placing out

In the forming of the trains the wagons of established dangerous goods must be spaced out as follow:

- wagons with danger labels n°1, 1.5 must be spaced out with almost one covered wagon with 4 axes or with 2 covered wagons with 2 axes, loaded with not dangerous good from the wagons with labels N°3, 4.1, 4.2, 4.3, 5.1, 5.2, 05;
- wagons with danger labels n°1,1.5, 01 must be spaced out with almost one covered wagon empty or loaded with not dangerous good from the wagons with labels N° 7D*;
- wagons with danger labels n° 5.1, 5.2, 05 must be spaced out with almost one covered wagon empty or loaded with not dangerous good from the wagons with labels N°3, 4.1, 4.2, 4.3;
- wagons with danger labels n° 01 and wagons with danger labels n° 3, 4.1, 4.2, 4.3, 5.1, 05 e 7D* must be spaced out with almost one covered wagon empty or loaded with not dangerous good;
- tank wagons or loading tanks with the labeln°4.3 and those marked
- with a strip horizontal orange coloured must be placed out with almost a wagon loaded with not dangerous goods or empty from wagons loaded with beams;
- wagons with danger labels n°1, 1.4, 1.5, 01, 7D* and tank wagonsor loading tank with danger labels N°3,4.1,4.2,4.3, 5.1, 5.2, 05 e 13 must be placed out from the engine with almost a wagon loaded with not dangerous goods or empty;
- wagons with danger labels n°1, 1.5, e 01 must not be located in rear of the train.

**Placing out
each other of
wagons**

**From the
engine**

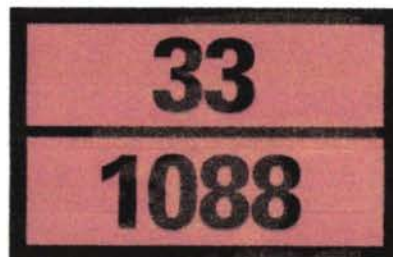
**From the rear
of the train**

Art. 4

Signalisation of tanks loading dangerous goods

The tanks must present on both sides, a table orange coloured of cm 30x 40 with the numbers of danger identification (upper part) of the material.

Example of orange signalisation:



The danger identification number is settled by two or three figures: Usually the figures show following dangers: :

- 2 Emission of gases caused by a compression or a chemical reaction
- 3 Flammability of liquid materials (vapours) and gases
- 4 Flammability of firm substances
- 5 Oxidizing substances
- 6 Poisonous substances
- 7 Radioactive materials
- 8 Corrosion substances
- 9 Instability (danger of spontaneous violent reaction)

The repetition of a figure shows a deeper danger. When the danger of a good is indicated with one figure this figure must be completed by zero.

When. the danger identification number is preceded with a X that means that the material interacts dangerously with water. For such materials water cannot be used without experts approval.

**Annex 10.3.2 Scheme of operating and
projected crude oil pipelines in
Kazakhstan**

Scheme of operating and projected crude oil pipelines in Kazakhstan



Source: "Organizational - technical aspects of transportation of oil and mineral oil by rail" S. E. Bekjanova.

Legend:
 Operating pipelines ———
 Projected pipelines - - - -

Annex 12.1 **Seminar Agenda and
presentations**

Review of Railway Rehabilitation in Central Asia

(EUROPEAID/116151/C/SV/MULTI)

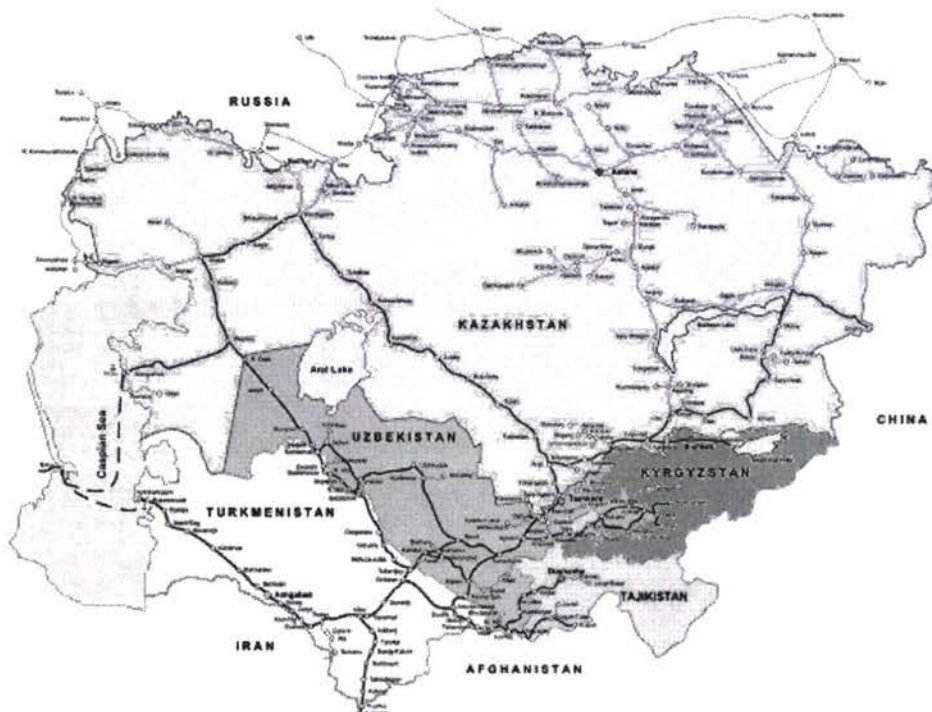


Mid -Term Seminar

- Achievements of Module A
- Programme for Module B

18-19 November 2004

Tashkent - Uzbekistan



A project implemented by:  ITALFERR

Seminar Agenda



18 November 2004

Chairman P. Pezant

14.00: Registration

14.15: Opening Seminar (P. Pezant)

Introductory words by Project Manager (A. Baidebekova) and Project Director (A. Veralli)

14.40: Project Activities to date (P. Pezant)

Session 1 – Issues in Interoperability

15.00: Project views and proposals (A. Veralli, M. Peyronel)

16.00: Round table discussion and comments on chapter N°7 (interoperability), chapter N°9 (multimodality), chapter N° 10.3 (Dangerous goods operation)

17.00: Coffee break

Session 2 – Border Crossing and Trade facilitation

17:30: Presentation of TRACECA Trade Facilitation Project and of the achievements of the Common Legal Basis for Transit project (V. Turdzeladze)

18.10: Project Proposals for facilitating railway border crossing (M. Martin)

19.00: Round table discussions

20.30: Dinner

Seminar Agenda



19 November 2004

Chairman Mr P. Pezant

9.00: Opening activities (P. Pezant)

Session 3 – Signalling and Safety

9.10: General trends and possible options for Central Asia (P. Debarbieri)

9.40: Round table: Discussion of issues and tentative agreement on suitable solutions

10.40: Coffee break

Session 4 – National development plans for railway transport in Central Asia and views on development of TRACECA corridor

11.00: Railway development plan in Kazakhstan (Kazakhstan Railways)

11.20: Railway development plan in Kyrgyzstan (Kyrgyzstan Railways)

11.40: Railway development plan in Uzbekistan (Uzbekistan Railways)

12.00: Railway development plan in Tajikistan (Tajikistan Railways/MOT)

Session 5 – Activities for the remaining Project

12.20: Proposals for selection of sections to be submitted to feasibility study under module B (A. Veralli/ P. Pezant)

12.30: Comments of beneficiaries on proposals

12.50: Financing of feasible projects (P. Pezant and Beneficiaries)

13.10: Programme for the remaining project

13.20: Requested assistance from beneficiaries (A. Veralli)

13.25: Closure of Seminar

13.30: Lunch

Session 1

Issues in Interoperability

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Session 1

Project views and proposals

A. Veralli, M. Peyronel

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4



Session 1 / Issues in interoperability

Premise

- **Interoperability** by definition is the ability of a "rail system to allow the safe and uninterrupted movement of trains which accomplish the required levels of performance for this network. This ability rests on all the regulatory, technical and operational conditions which must be met in order to satisfy the essential requirements".
- The original formulation was for being applied to the European network where despite the fall of the border such ability was not in place because differences in technical standards and operation rules. Thus today interoperability for the European railway network is a target.
- Interoperability is to be considered the dealing issue or the framework where almost all items outlined by ToRs should be collocated. This is the case of border-crossing, standards, operating procedures, dangerous good transport issues and also in some way of the multimodal transport.

Session 1 / Issues in interoperability

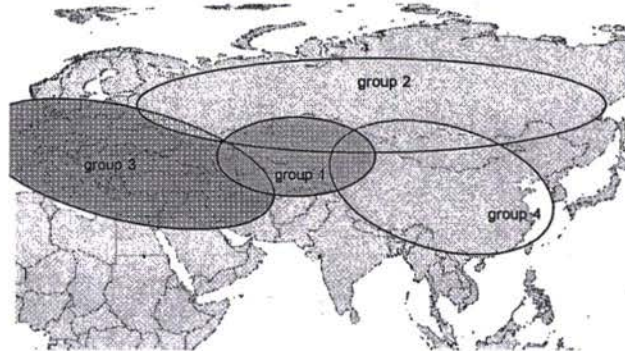
Premise

- A transposition tout – court of the concepts to the Russian standard area was, at the time of Soviet Union, a no-sense exercise. The harmonisation of Russian standards both for technical aspects and operation aspects was a fact and not a target and traffic flows were running unimpeded through the whole railway network.
- Nowadays a possible target is how to maintain such compatibility taking advantage of the recent technological innovation and overcoming troubles generated by the obsolescence of existing devices.
- An other possible target is how to improve the compatibility with the rest of the world in order to get the maximum advantage from the position of the Central Asian countries in the respect to the big economic markets.

Session 1 / Issues in interoperability

Premise

Interaction between groups of rail network adopting different standards



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Session 1 / Issues in interoperability

Premise

- This means that when the system is deemed to overpass the national border because of the concept of "inter-operability", a solution for a single part cannot be left to a single countries but it should be agreed among commercial partners.
- The rail service provision works is based on a systemic approach where changes in a single part could imply consequences in whole system.
- New implementation as well as rehabilitation of existing lines must follow a general framework where changes in the existing standards have to be carefully examined and integrated into the concept of the rail "system".

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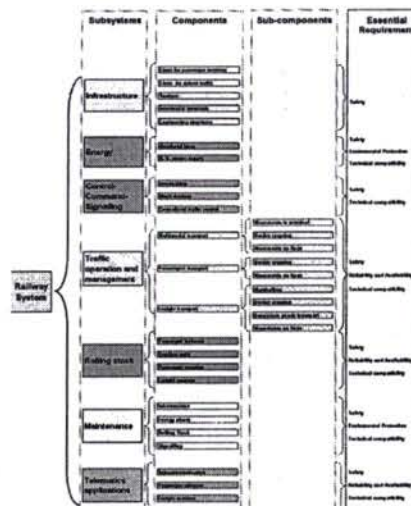


Session 1 / Issues in interoperability

Premise

- Because of the local situation which had historically the big advantage of a complete interoperability:
 - ✓ Actions should be undertaken in order to maintain the existing situation for the infrastructure;
 - ✓ The related existing standards should be maintained as much as possible with the only exception of the technological part of the railway system where new standards should be carefully examined and agreed between concerned parties;
 - ✓ The technological part is obsolete in several cases, so changes are strongly needed and related standards should be agreed.
 - ✓ In this respect the possibility to have a committee of Central Asian railway experts should be certainly examined.

Session 1 / Issues in interoperability



Session 1 / Issues in interoperability

A G C

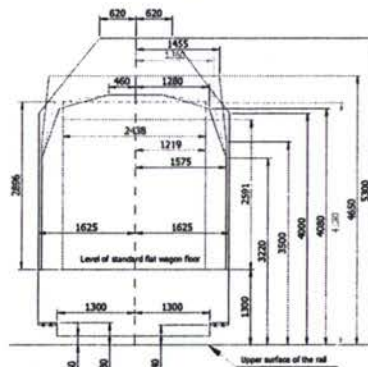
INFRASTRUCTURE PARAMETERS FOR MAIN INTERNATIONAL RAILWAY LINES

	Existing lines (1)	New lines (2)	New lines (3)
1 Number of tracks	-	2	2
2 Vehicle loading gauge	UIC B	UIC C1	UIC C1
3 Minimum distance between track centers	4.0 m	4.2 m	4.2 m
4 Nominal minimum speed	160 km/h	300 km/h	250 km/h
5 Authorized mass per axle			
Locomotives ($\leq 200\text{ km/h}$)	22.5 t	-	22.5 t
Railcars and rail motor sets ($\leq 300\text{ km/h}$)	17.0 t	17.0 t	17.0 t
Carriages	16.0 t	-	16.0 t
Carriages Wagons $\leq 100\text{ km/h}$	20.0 t	-	22.5 t
Carriages Wagons $\leq 120\text{ km/h}$	20.0 t	-	20.0 t
Carriages Wagons $\leq 140\text{ km/h}$	18.0 t	-	18.0 t
6 Authorized mass per linear meter	8.0 t	-	8.0 t
7 Test train	UIC71	-	UIC71
8 Maximum gradient	-	35 mm/m	12.5 mm/m
9 Minimum platform length in principal stations	400 m	400 m	400 m
10 Minimum useful siding length	750 m	-	750 m
11 Level crossings	none	none	none

(1) Existing lines which meet the infrastructure requirements and lines to be improved or reconstructed
 (2) New lines for passenger traffic only
 (3) New lines for passenger and goods traffic

Session 1 / Issues in interoperability

Comparison of loading gauges (mm)



Russian standard Loading gauge "Common network" ———
 European standard gauges: B ———, C ———, D ———
 Containers: 8' x 40' = 2438 x 2591 = 1219 mm ———
 "High cube" 8' x 40' = 2438 x 2996 = 1219 mm ———

From this comparison we can deduce that the Central Asia railway system is in very favourable infrastructural conditions regarding the interoperability

General consideration on Interoperability and Standards

The standardization of railway systems extended to every elementary constituents allows the safe and uninterrupted movement of trains on them, that is a complete interoperability from the technical point of view.

Furthermore standardization of materials generally allows reduction of expenses for supplying and storing spare parts as well as for the maintenance. Standardization of plants allows savings in maintenance and instruction of personnel.

Session 1 / Issues in interoperability

General consideration on Interoperability and Standards

- ⌈ Target of railway undertakings should be to optimise the extension of standardization of systems interested in the interoperability.
- ⌈ It has to be remarked that in some situations the fast evolution of new technologies together with the obsolescence of existing devices has brought into the picture the need of abandoning the existing standards, taking in due account the necessity to avoid any reduction of the interoperability levels and possibly to increase them.
- ⌈ Example of components that are to be revised to improve the interoperability of the system are strongly related to those new technological aspects as well as in modifying redundant rules (i.e. Border Crossing), and procedures to guarantee higher safety levels (i.e. Transport of Dangerous Goods and Oil Products).

Session 1 / Issues in interoperability

- In general terms, existing standards are adequate and the target is to maintain them as much as possible. Changes in the standards are convenient only for those components interested by a fast evolution of the technology.
- Thus after a general overview of all aspects, only those having a big relevance in the immediate future have been further investigated. The result has been presented within the chapter of pertinence of Draft Report of Module A:
 - Border crossing issues – Chapter 8;
 - Multimodal transport – Chapter 9;
 - Standards (Safety Plans, Telecommunication Plans) and Dangerous goods transport – Chapter 10.

Session 1

Multimodality

M. Peyronel

Session 1 / Multimodality

The actual low volumes of container traffic do not help to invert the existing negative trend for such traffic.

Difficulties to obtain in a short time big results in developing multimodal transport are evident, whatever measures could be taken.

Anyway the experience has proved that critical situations could be some times the occasion to review the criteria followed in the previous periods with the target to discover more convenient and rational solutions.

The development of multimodal techniques are in the transport field a revolution that could bring great advantages for customers in terms of lower costs and higher levels of services. In our opinion, railways undertakings have to be prepared to face an increasing of multimodal demand from the market in a short time after appearing inversion of tendencies in the economical situation.

Recommendations

About Infrastructure

- Upgrading terminals that are considered possible origin/destination of specialized container trains (in particular installing 40t lifting equipments)
- For the new lines, adopt a wider gauge that include European gauge "C".

About Operation

- Start as soon as possible to offer specialized container trains running on the routes that are open to improvement of traffic in accordance with a time table
- Implement all the operation improvement that could reduce travel time and improve the level of services; most of them are mentioned in the above chapters.

Recommendations

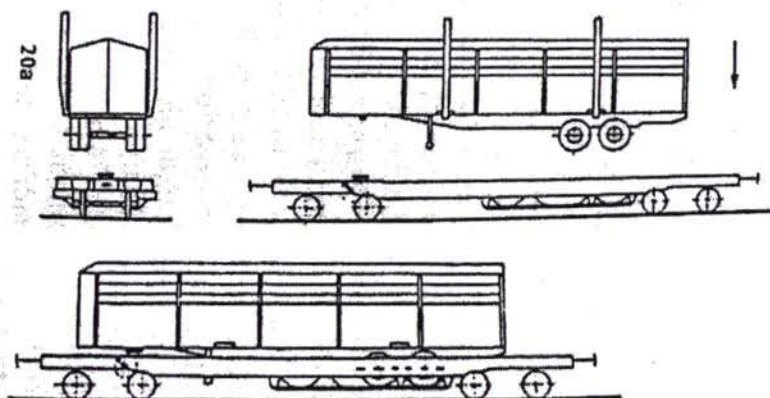
About tariffs

- Within the limit imposed by costs, reduce the tariffs for the transport of containers.

About rolling stocks

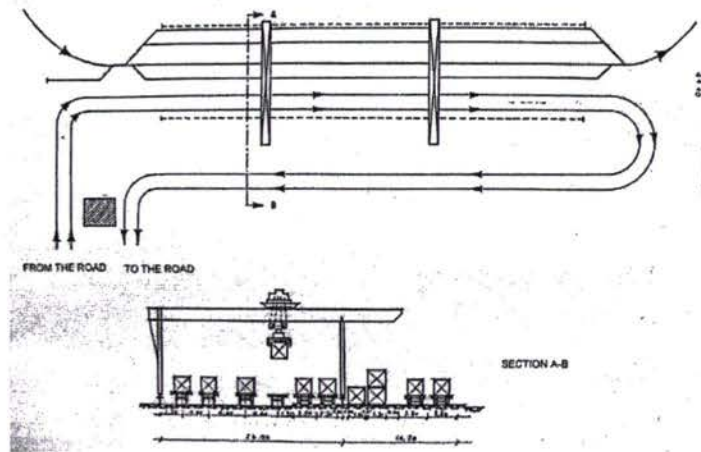
- Provide some "poche" wagons to experience the transport of trailer and semi trailer that are successfully used in Europe (Figure 9.1). Advise customers about the possibilities of convenient transport by rail of swap bodies, in case a massive turn over of the existing heavy road vehicles, generally obsolete and inadequate for the transport of big volume of goods, will start in the Central Asia countries.

Scheme of a semi trailer loaded on a "poche" wagon



Session 1 / Multimodality

Scheme of a big intermodal terminal



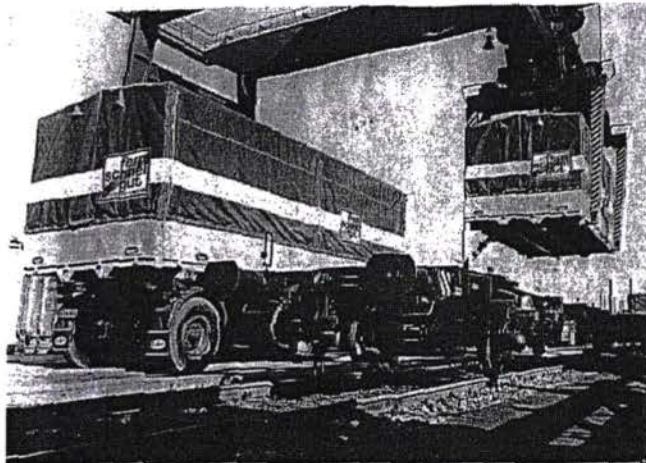
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Session 1 / Multimodality

Gantry crane lifting a swap body



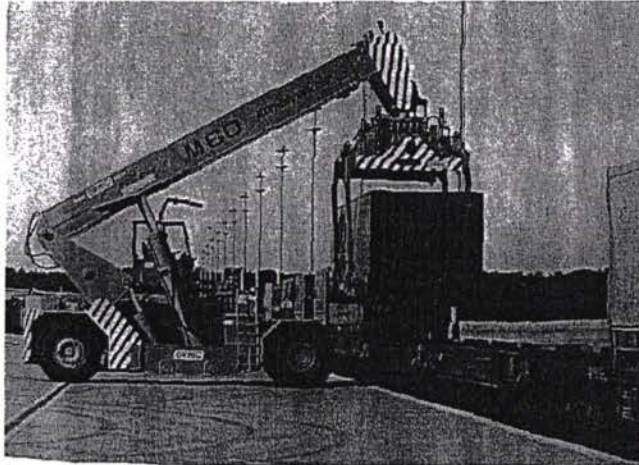
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Session 1 / Multimodality

A container handling front lift at work



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Session 1 / Multimodality

Dushanbe terminal



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Session 1

Dangerous goods operation

P. Debarbieri

Session 1 / Dangerous goods operation

Scope of the assessment

The scope of the assessment presented was:

- to describe present situation of transport of dangerous goods in the main countries of Central Asia
- to sum up European International Regulations highlighting the prescriptions adopted;
- to give suitable recommendations in order to improve safety of people, environment and things.

Session 1 / Dangerous goods operation

General 1

In the international sphere an experts committee, instructed by the Economic and Social Council of United Nations, periodically writes the recommendations to be applied to all transport modes.

The recommendations are then implemented to the international rules in accordance with outlines involving road, railway, marine and air transport

The technical regulations to be valid in each State must be later converted in law.

As such rules must control also intermodal transports (for instance train + ship), they must be coordinated.

Session 1 / Dangerous goods operation

General 2

With reference to the railways we can say that this mode is the one that enables to better transportation of big amount of goods with safety conditions: in fact, it has the lowest accident index among land transport modes.

For this reason, dangerous goods represent a segment of a market in which railways are in a strong position and, therefore, must be cured in an appropriate way.

Present Situation in Central Asia Railways

To regulate transportation of dangerous goods, the countries of Central Asia have signed a Convention with partner countries of the former USSR Republics and others during the 15th session of Railway Transport Council (1996).

The Convention is referred to the "Rules of transportation of dangerous cargoes on railways" (edited in sixty's, confirmed in 1994 by the Russian Transport vice Minister and reprinted on 1997 without significant up datings).

Classification of dangerous goods in Central Asia

Dangerous goods according to GOST 19433-88 "Dangerous goods. Classification and marks" are divided into 9 classes of danger.

Dangerous goods of each type are divided into subclasses, categories and groups according to their physical and chemical properties, kinds and degree of danger at transportation.

About 500 dangerous good are codified.

Rules applied in central Asia

The Rules include specific chapters that are as follows:

- Dangerous goods admitted to transportation
- Official registration of papers
- Accompanying of dangerous goods
- Transportation of dangerous goods in covered cars and containers
- Requirements for cars and containers and their accommodation of dangerous goods for transportation.

Application of Rules in Central Asia

Above Rules should be mandatory for workers of the railway transportation system, senders and addressees, ports and quays as well as for the forwarding enterprises which carry out the services of consignors and consignees.

The difficulty of application of the rules is connected to the number of staff involved and to the fact that these rules do not result to have been received in any State Law.

The Kazak context

The interviews carried on in the Kazak context by the Consultant have underlined:

- on railway a position of first level is taken by crude oil and processed oil products (kerosene, gasoline etc) that are coded as dangerous goods;
- the Government envisages that the production of the chemical and petrochemical industry to be increased by 3-4 times by 2030;
- the trend of dangerous goods transported is strongly growing up owing foreseen increasing of mine and oil wells, and of import-export especially with China, Russia and Iran.

The Uzbek context

In Uzbekistan dangerous goods are almost the 50% of all transported goods and the biggest part is conveyed by railway.

These goods are mainly hydrocarbons (80%); the others are chemicals (ammonia, acids, chlorine etc) for industrial or for agricultural purpose (fertilisers).

Most of these products are transported by tank wagons.

Session 1 / Dangerous goods operation

The European context

The present European rules referred to dangerous goods, mainly shows what follows:

- 1) Fundamental task of the Regulations is prevention of accidents risks and limitation of consequences of such risks;
- 2) Division in classes of dangerous goods that takes into account the kind of risk involved by their manipulation and transport;
- 3) Identification of general and detailed prescriptions applied to each class;
- 5) Identification of prescriptions to point out the presence of tank wagons;
- 6) Identification of detailed prescriptions on labelling of tank wagons and container wagons.

Session 1 / Dangerous goods operation

European international regulations

The Commission of the European Communities, having regard to Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system, has adopted decisions to be respected for:

- the basic parameters of vehicles for the transport of dangerous goods
- Marking and Labelling of wagons
- Tank testing, inspection and marking
- Maintenance of tanks and its equipment

The RID classes of dangerous goods

Dangerous goods according to RID (Reglement International concernant le transport des marchandises dangereuses par chemin de fer) are divided into 9 classes of danger.

The classified substances are nearly 2000 and are grouped together in danger classes.

RID integrative prescriptions

They include:

Out of order vehicles

Accidents, emergency

Security

Danger labels

Spacing out of rolling stocks

Bans and restrictions of shunting

Session 1 / Dangerous goods operation

Comparison between RID and Regulations in force

Some aspects of the regulation in force seems less stringent compared to RID, in particular:

- some general and special requirements are insufficiently stated;
- no positions on restriction of weight of dispatching of dangerous goods of various classes
- number of materials classified as dangerous is 500 compared to 2000 of RID
- lack of significant updating of the regulations

Session 1 / Dangerous goods operation

Focus on safety

As the railway transport of dangerous goods must be done abiding to the safety standards, making unlikely accidents and minimizing their possible effects, we must emphasize the following aspects:

- Safety level of permanent way and tracks;
- Safety level of the equipments that control trains spacing and movements;
- Technical and functional compatibility of rolling stocks (gabarit, inscription in curve, dynamic behaviour)
- Maintenance methodology of such compatibility as well as of the safety levels;
- Correct training of operators.

Recommendation n°1

To harmonize (align) the regulation in force to the RID Convention for national and international transports.

The gradual implementation of this Convention would allow:

- to better achieve the fundamental task of hazards prevention;
- to operate on the basis of a methodology that is widely tested and effective also in case of heterogeneous and intense traffic;
- to adopt regulations as regards of intermodal transports according to the rules of EU and ONU
- to avoid that many dangerous materials are transported as not dangerous because they are not codified

Recommendation n°2

In any case the Convention adopted should be converted in law of the members States to become mandatory for all (inspector and workers of railway transportation system, senders and addressees of dangerous goods, ports and quays as well as for the forwarding enterprises which carry out the services of consignors and consignees).

Recommendation n°3

In case the volume of transported goods increases, the adoption of RID Convention will not be sufficient to keep low the number of accidents and their effects if not providing the due attention to the problems listed at slide 16. The solutions of these problems shall result in the primary circulation safety of all the sectors and specifically of dangerous goods.

Recommendation n°4

As nearly all dangerous goods are transported in tank wagons and the tank wagon fleet is mainly outdated and worn-out, we recommend to plan their gradual replacement.

Recommendation n°5

Supply stations staff and drivers with synthetic and practical instructions that can help them in their duties both in ordinary and emergency situations

Recommendation n°6

In case of accident, the operational staff shall primarily take care of people's safety. Therefore it is imperative that the service is as timely as possible. To the first aid squad should be immediately given all the necessary information to organize its work.

In this regards the Consultant suggests to utilise informatics programs that can supply the station and control staff as well as the emergency squads

It is necessary that such tools include all the information on the transported goods, especially those carried in tanks (classification, meaning of danger labels etc.)

Recommendation n°7

In case of accident in order to prevent its repetition the railway should analyse the whole context of what happened to research and find the reasons.

The aim of the board of inquiry should not be to find the guilty but because the accident happened.

Recommendation n°8

In order to improve the renewal of the fleet of tank wagons the Consultant suggests a policy of privatisation of a part of the fleet.

This policy could also develop a sort of fidelity of the customers of railway.

Session 1 / Dangerous goods operation

Recommendation n°9

From the analysis of the derailments occurred during several years in South Europe Railway we noted frequent derailments of the wagon located in the rear of the trains.

So for the train carrying dangerous goods we suggest, in order to limit the consequences of a derailment, to adopt detectors based on the measure of vertical acceleration that are able to make the driver aware of the fact that last axes are going out so that breaking could be immediately activated even if the brake conduct is not broken.

Session 2

Border Crossing and Trade facilitation

Session 2

TRACECA Trade Facilitation Project and Common Legal Basis for Transit Project

V. Turdzeladze

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Session 2

Proposals for facilitating railway border crossing

M. Martin

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Session 2 / Proposals for facilitating railway border crossing

The influence of delays in rail border crossings as regards the transit time along TRACECA corridor.

If we take into consideration the trunk of the corridor TRACECA in Central Asia countries from Kok-Jangak (Kyrgyzstan) to Aktau (Kazakhstan), with transit through Uzbekistan, Tajikistan, Uzbekistan and Kazakhstan, we have a distance of 2589 km distributed as it follows:

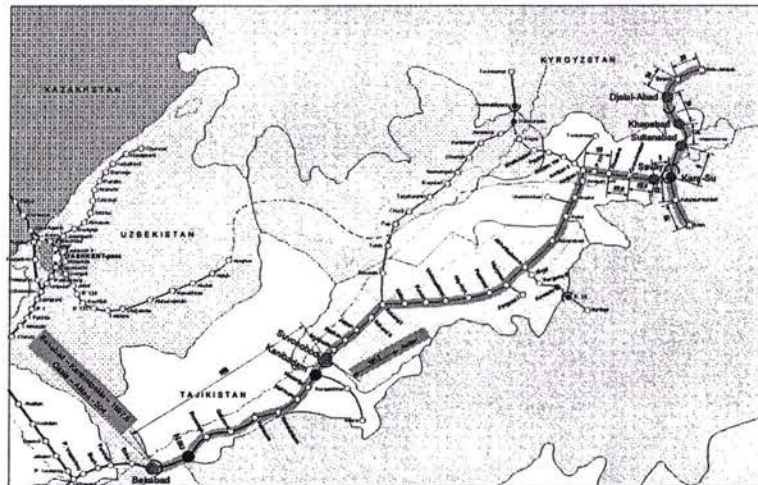
Kyrgyzstan	36 km
Uzbekistan	16 km
Kyrgyzstan	8 km
Uzbekistan	222 km
Tajikistan	106 km
Uzbekistan	1697 km
Kazakhstan	504 km
Total	2589 km

The rail border crossing posts along this trunk with associate waiting time in each border post are:

Standard time budget in rail border post (H)	
Djalal-Abad (KRG)	3
Hanabad (UTY)	2
Sultanabad (UTY)	3
Karasy-Uzbekiskiy (KRG)	3
Savay (UTY)	2
Suvonobod (UTY)	3
Kanibadam (TAJ)	2
Nau (TAJ)	2
Bekabad (UTY)	3
Subtotal	23
Karakalpkiya (UTY)	3
Oazis (KTZ)	2
Aktau (KTZ)	6
Total	34

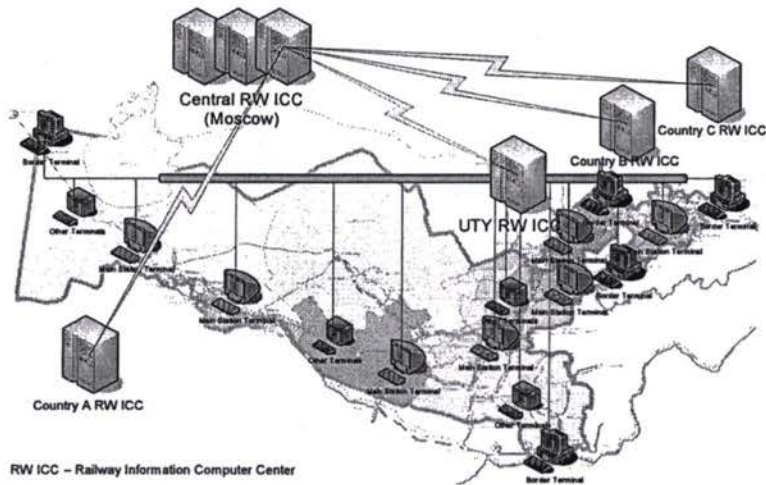
Session 2 / Proposals for facilitating railway border crossing

Bottleneck



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Computerization system for management of Railways activities in CIS Countries

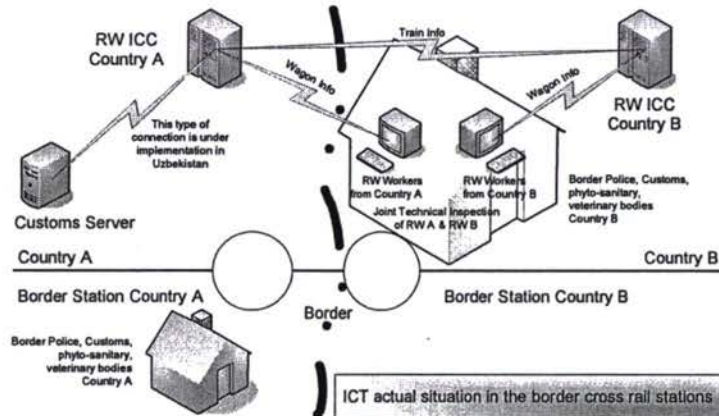


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Main conclusion and preliminary recommendations.

When approaching the problem of the “border crossing procedures”, the studies, elaborated under the TRACECA umbrella, focus mainly on road border crossing posts, whereas the problems concerning the railway border crossing procedures are almost not mentioned. Analyzing the actual situation from the 4 countries involved in the present project, the Consultant identified the following constraints that nowadays block the thinning of the traffic through rail borders.

These constraints are:

Nonphysical constraints (valid for all the countries in central Asia and Caucasus):

- ❖ The lack of a common legal basis regarding the railway transit represents the main non-physical constraint for freight traffic through border crossing posts, this fact implying supplementary documents and slow customs procedures of processing in border. The procedures differ from one country to another;
- ❖ the absence of an institutionalized procedure regarding the computerized data exchange between the Railways and the Customs;
- ❖ the lack of an institutionalized procedure regarding the computerized data exchange between the Customs from the neighboring countries, including the railway traffic;
- ❖ the different entities present at border act independently; the concept of integrated border management does not exist.

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Physical constraints:

The relative recent establishing of the new borders in Central Asia led to the situation in which the railway station that were not functioning as rail border station would become border crossing posts without disposing of the necessary infrastructure that would permit the installing, besides the railway's staff, of the different bodies that should unfold their activity in border, i.g. Customs, Border Police and phyto-sanitary entities, and the associated communication infrastructure. This situation determines an unfolding of the activities of these entities in difficult conditions with direct influence on the delays of the border crossing processes. On the other hand, the lack of technical means leads to a low quality of the physical controls carried out in border or to the impossibility of making them, the customs offenses being hard to be detected. The objective necessity of a physical control may determine the blockage of an entire train.

The establishing of the borders in the countries of Central Asia but also the relief configuration meant objectively situations in which, on relative short distances, a railway section would cross more borders. These situations represent bottlenecks both for the local or regional traffic and for the long route traffic, even in the conditions in which the crossing time through the border is the standard one.

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Consultant proposed two sets of recommendations:

- **recommendations on a short term (1-2 years), at the level of each country implicated in this project**
- **recommendations on a medium term (3-4 years), whose implementation supposes a co-operation and a coordination of the efforts at the level of at least two neighboring countries**

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Short term recommendations

The adoption of the SMGS as customs transit document, independently, by each state.

This may be achieved based on an Agreement between the Railway and the Customs, without waiting for the complicated procedures of adoption and ratification on-going conventions promoted by OSDJ and TRACECA. In the report there is presented the Agreement memorandum between the CFR (Romanian Railway Administration) and the Romanian Customs, by which the Railway Common Transit procedure is implemented as a precursor document to Romania's accession to the European Community. Analyzing the text of the Memorandum, we must notice two important aspects:

- the railway transport document (rail bill) becomes a customs transit document, too;
- there is not introduced any restriction as regards the nature of the transported goods, that is, for the sensitive goods, supplementary customs guarantees should not be applied.

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Selected Border Crossing and Transit agreements in the Silk Road area

- ❖ Transit Transport Agreement (China, Kazakhstan, Kyrgyzstan and Pakistan) of 9 March 1995
- ❖ Intergovernmental Commission of the Transport Corridor Europe- the Caucasus- Asia (IGC- TRACECA) Basic Multilateral Agreement on International Transport for development of the Europe- the Caucasus-Asia corridor (Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine and Uzbekistan) of 8 September 1998.
- ❖ Economic Cooperation Organization (ECO) Transit Transport Agreement (Afghanistan , Azerbaijan, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan) of 9 May 1998
- ❖ Agreement on International Road Transport (China, Kyrgyzstan and Uzbekistan) of 19 February 1998.

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- ❖ The railway should name specialized staff, accepted by the customs, according to the customs legislation, that would carry out the receiving and processing of the SMGS rail bills as transit documents.
- ❖ Distinctively from the specific customs activity, the railway should introduce a subsystem of computerized processing of the SMGS as customs transit document, including the surveillance of the closing of the transits. This activity of supervising is to be unfolded under the management of a specialized department – accountancy centre- of the railway.
- ❖ The customs shall reserve all the prerogatives concerning the initiation and the surveillance of the operations of railway customs transit; it shall adapt, nevertheless, the actual processing systems to the new transit document, which is the SMGS.

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- ❖ The Customs and the Railway should implement the electronic data exchange for the surveillance of the transits and should conclude an agreement in order for the communication network of the railway to be also used by the customs at least in the border posts.
- ❖ It should be done an auditing of the border railway stations and according to the volume of the present and estimated traffic, it should be elaborated the standards of typical equipment of a border railway station and it should be proposed investment programs for their upgrading to the proposed standards. These standards must refer to the minimal necessary equipment for the unfolding of the border crossing processes of all the implicated entities, in normal conditions.

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Medium term recommendations

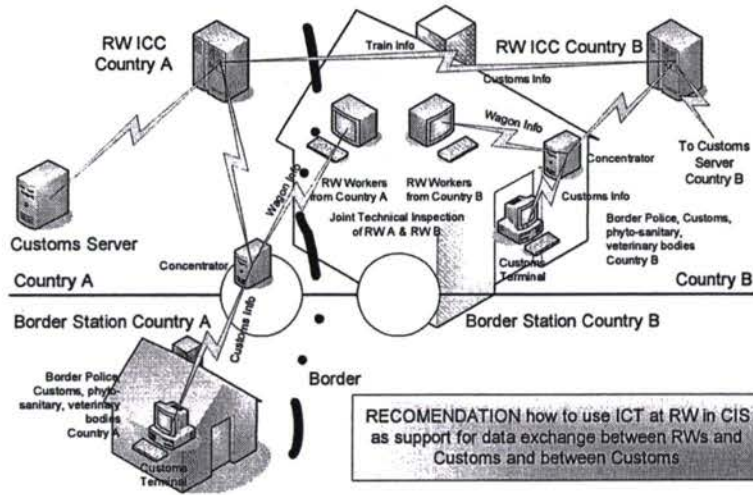
- ❖ The implementation of the modern methods of the management of the customs activities regarding the risk management and, respectively, the post entry checking for goods transported by rail.
- ❖ On the basis of bilateral agreements, there should be implemented the data exchange between the Customs administrations as a support for the data base regarding the risk analysis and for pre-advising rail traffic approaching a rail border post. As physical support, for this data exchange, the actual data transmission network of the Railways should be used.
- ❖ The concept of joint border processing should be introduced as "joint processing in common rail border stations"
- ❖ There should be concluded agreements between the railway administrations from the neighboring countries so that, at least on the sections that link two stations in the same country, transiting through the neighboring country, the railway infrastructure of the transit country should be used by the neighboring railway.

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General observation

- Finally, it must be underlined that, when different studies and/or bodies bring into discussion border cross issues the attention is focused on the processes' acceleration without highlighting the importance of the activities concerning the prevention of the customs offences and/or illegal traffic of immigrants.
- Practically, the implementation of the measures regarding the improvements of the processes of border crossing must be part of the Integrated Management Strategy of the state border.
- Such strategy should intend to fulfill the unitary coordination, at central and territorial level, of the actions and measures taken for the security of the state border.
- The scopes of these actions and measures taken by competent bodies with border responsibilities are to monitor and to fight against the transnational infringement phenomenon, to achieve the compatibility with the international rules and procedures regarding the state border surveillance and control in order to ensure the conditions for fast border crossing procedures in safe conditions.

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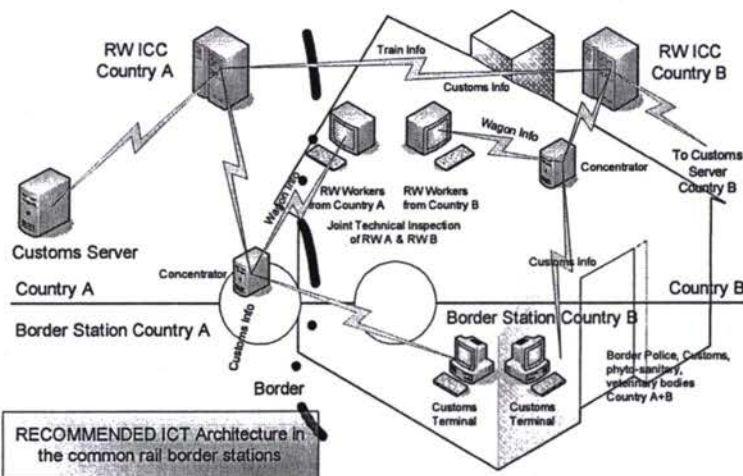


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Session 3

Signalling and Safety

P. Debarbieri

Session 3 / Signalling and Safety

Interlockings, Block Systems and Safety Devices

The aim of the assessment presented is:

- to supply an analysis of the present situation in Central Asia railways of the safety devices.
- to supply an overview about electronic interlocking and block/ATP systems in Europe;
- to find, from the comparison, possible and justified upgrading of present interlocking and block systems in Central Asia countries;
- to find technical and economical solutions (in-line with European standards) suitable for maintaining interoperability and improving safety

Session 3 / Signalling and Safety

Present situation in Central Asia Countries

Present equipments typologies are :

- Mechanical Key Dependence Interlockings
- Electric Relay Interlockings
- Half Automatic Block Systems
- Automatic Block Systems with Cab Signal
- Centralized Traffic Control (CTC)

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Mechanical Key Dependence Interlockings

These systems:

- allow station personnel to operate points and signals through electromechanical devices;
- are based on a central lock where the keys, collected from points, are imprisoned in order to secure points in the required positions;
- perform a secure connection between signals and points so that itineraries remain interlocked until the train has cleared the section.

but they can't be remotely controlled and supervised from a central place (CTC) and need staff to hand operate the points

Electric Relay Interlockings

These installations:

- **establish the entrance and exit routes by selecting and locking the points in the corresponding position for the required route, lock the route, permanent check if the route is free and give the free signal for the route;**
- **prevent other routes setting that could endanger the train route;**
- **allow station personnel to operate points and signals via electrical devices from a single post that contains a command and control desk and where the movement inspector generally operates;**

These devices can be remotely controlled and supervised from a central place (CTC) and can be unmanned.

Half Automatic Block Line Systems

This system:

- **is a connection between corresponding stations equipped with electro-mechanical or electric - relay interlocking devices**
- **is based upon equipments ability to detect the occupancy of the section between stations**
- **the signals can be set to clear only if the section is not occupied.**

**As known, from a station to the corresponding one, only one train at a time can run on each track.
The stations can't be unmanned**

Automatic Block Line Systems

- ABLS divides the line in block sections controlled by track circuits and protected by side light signals, displaying the reading code for speed to the driver.
- By means of permissible indications displayed, the train is authorized to advance and occupy the block section protected by respective signal.

This system permits the between stations-spacing of several trains running in the same direction and the stations can be unmanned

Cab Signal

- Automatic block is supplied with continuous signaling cab sent in the track circuit in advance the light signal at the train approaching.
- The current is sent into track circuits as a combination of pulses which contain the information about next signal light aspects
- The automatic cab signaling is usually integrated by a self-braking device with an equipment for checking the vigilance of the driver and for controlling, in some cases, train speed.
- The automatic vigilance starts from the instant the engine-man's indicator changes to a more restrictive aspect to the instant the driver gives the confirmation by pressing an acknowledging contact.

In all cases if the acknowledging contact will not be pressed in the due time by the driver, the train automatically stops by means of a self-braking device before reaching the next closed light signal

CTC (1)

The main types of CTC , currently in service, are:

- **Neva: the oldest, totally with relay technology;**
- **Lutch: dating back to the eighties, still with relay technology but with greater control potential**
- **Dialogue: the most recent (computer aided system)**

CTC (2)

The main differences between relay and computerised CTC systems are:

- **Upper limits in the number of controlled line objects**
- **Greatest transfer rate of the information**
- **Automatic management and listing of the train number and train graph**
- **Possibility to operate several line sections from the same working place**
- **Presence of diagnostics**
- **Information interchange with adjacent line sections and with systems of top level**

CTC (3)

- From the Control Centre of a computerised system it is possible to command itineraries by clicking on the extremes with a mouse.
- Lines are displayed on monitors that also repeat the position of signals, block section occupation and the number of trains in circulation.
- The indications of the control panels of the individual stations can be called up on monitor for any individual manoeuvres.

CTC (4)

- The utilisation of this type of systems allows increase productivity of operators. And besides:
- The location in the same central control post for the various subsystems (traffic, maintenance, information, possibly catenaries, etc.) facilitates relations between the various operators, permitting the minimisation of the time and entity of disturbances to circulation.
- The flexibility of system configuration could also permit significant economy in terms of skilled personnel by varying jurisdiction of the positions according to the situations which typically occur throughout the day (peak hours, night hours etc.)

CTC (5)

CTC extension allows to achieve reductions in management costs, optimisation of traffic control and plants maintenance both in normal and in disrupted situations.

For the above-mentioned reasons the Consultant suggests to extend electric (all relay or electronic) interlockings, automatic block systems and computer aided CTC to the lines that will be upgraded.

SECOND PART

A FIRST GENERAL CONCLUSIONS

In any case, the interventions in the signaling sector must allow Beneficiaries to:

- continue to enjoy interoperability i. e. common features as regards track, rolling stock and basic standards with consequent advantages to vehicle circulation potential, use of drivers and exchanges at frontiers;
- adopt technical solutions for new plants based on common standards also in order:
- to simplify specialised personnel training,
- to reduce stock problems and
- to constitute an important market for suppliers interested in entering a competitive manner.

STATIONS

STATIONS

Electronic interlocking in Europe (1)

- The introduction of solely relay type equipment began after the Second World War
- Electronic type safety and signalling systems first appeared in 1985
- The main reasons these systems were preferred over the previous generation systems were: smaller size, improved reliability and availability, simpler maintenance, easier modifications, easy replacement of the electromechanical apparatus in service, presence of diagnostic.

STATIONS

Electronic interlocking in Europe (2)

The basic principle of availability and safety of these systems lies in the doubling of the hardware.

Three systems were adopted:

The two from three system where the system compares the results of two units with a comparison method, while a third unit is on stand-by;

The two times-two system in which two systems function independently and another two systems are on stand-by;

Single channel systems have no redundant units. System safety is achieved using two different programs on the same unit

A SECOND CONCLUSION
For interlockings

As it is reasonable to foresee a cost lowering of these systems (which are going to spread all over the world) it may be advantageous to adopt the computer based interlockings for their better technical characteristics shown on above slide.

Computer aided interlockings

Cost referred to European market and compared with relays devices

- A) Field equipments:**
- nearly no costs difference
- B) Indoor devices:**
- Big stations: competitive costs
- Small stations: still higher costs

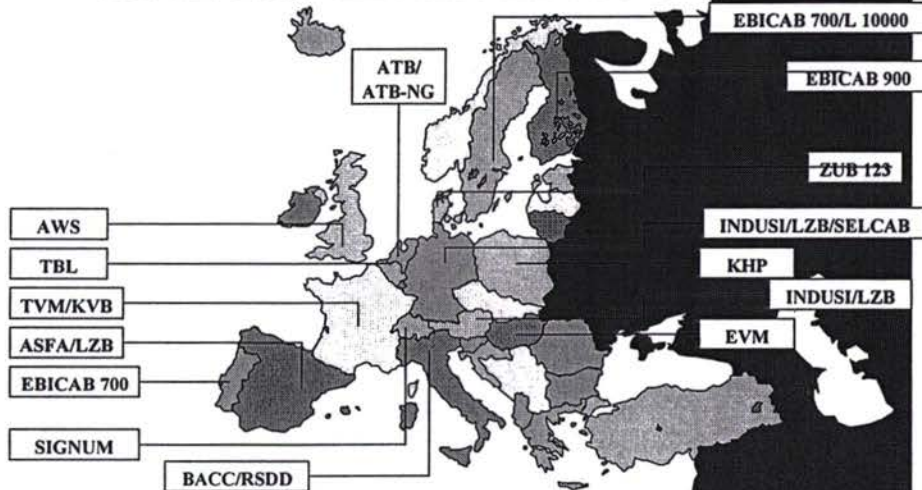
(the measure depends on several factors to be evaluated each time, nevertheless technical and functional characteristics of c.a. interlockings are more advantageous)

Computer aided interlockings

- In the opinion of the Consultant the computer aided interlockings can be taken into consideration avoiding their utilization in extreme environmental condition because, until now, we have not enough documentation of their behavior in such conditions.
- As extreme environmental condition we mean the simultaneous presence of very high temperature excursion (-40°C / $+50^{\circ}\text{C}$), high difficulty to reach the equipment, presence of sand, salt, unavailability of uninterruptible power supply etc.
- On the contrary important thermal excursion can be faced by redundant air conditioning plants.

LINE

EUROPEAN BLOCK AND ATP SYSTEMS



LINE

Block and ATP systems in Europe

- In the EU Members States are presently utilised even 15 different block and signalling types (see next slide)
- Interoperability demand pushed UE Members States to plan progressive adoption of a single system which is the new European Railways Traffic Management System (ERTMS).

LINE:European Railways Traffic Management System (ERTMS)

The objectives, the characteristics and the main functions of this system, however still not consolidated by the results of the trial sites and by the first implementation, will be analysed in a dedicated document that will highlight what ERTMS (ETCS +GSMR) allow to reach, that mainly is:

- Signaling interoperability among different systems;
- Cab staff cutbacks
- High degree of safety connected to the automatic interventions of the on board braking system
- Increase of lines transport capacity connected to the better utilization of the maximum line speeds
- High speed operation

Present block systems in Central Asia countries (1)

A situation opposite to the European one exists in central Asia networks where a single automatic block system is utilised with the characteristics already described

These systems have satisfactory characteristics as regards lines transport capacity and transport safety, both in present and medium term traffic volumes forecast.

Moreover these systems assures the interoperability demand between the different States.

In such situation the Consultant opinion is that the objectives allowed by ERTMS have not priority and the relatives investment high costs in the infrastructures and rolling stocks are not justified for renewal of Central Asia lines.

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Present block systems in Central Asia countries (2)

It is still possible to notice that the system on service does not automatically control speed limits imposed by:

- line conditions (for instance the geometry of the line)
- rolling stocks speed limits
- permanent or provisional speed restrictions

In the opinion of this Consultant the solution of these problems with an higher safety level shall be implemented only when traffic volume will substantially increase or suitable traffic monitoring should highlight an increasing trend of accidents due to driver wrong behaviors.

Session 3 / Signalling and Safety

Repetition of Digital Discontinuous Signaling (RSDD)

Some European networks are implementing systems which integrate their present spacing plants and allow:

- Driver warning in case of overcoming the nominal curve of allowed speed;
- Automatic braking service in case of overcoming the warning curve;
- Emergence braking service in case of overcoming the control curve of speed.

A THIRD AND LAST CONCLUSION

When the above conditions of greater traffic will take place these systems could be implemented without taking away present systems of automatic block, which therefore can logically be extended or renewed with no wrong expenses.

National development plans for railway transport in Central Asia and views on development of TRACECA corridor

Session 4

Railway development plan in Kazakhstan

KTZ

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Session 4

Railway development plan in Kyrgyzstan

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NATIONAL DEVELOPMENT PLAN IN KAZAKHSTAN¹

I shall list the programs which we accepted and have been already carrying out from 2003 until 2006. For the beginning, I shall list the development programs we have. This is a program on infrastructure development of the Western region; Development Program of Dostyk station and a line section up to Aktogay; a Program of second-track construction in Almaty – Shu line section.

Let us consider in more details TRACECA section. We have a station bordering China - Dostyk station. We faced big problems arising from the gauge width difference. They follow the European standard of gauge 1450, and we follow, as in the former Soviet Union, 1520 standard. This station is intended for the international transit from East Asia to Europe. Works are being carried out at present on opening additional cargo transshipment fleets. Two types of cargo operations are carried out at this station - cargo transshipment or bogies change.

The program foresees a construction of a marshalling yard at Dostyk station; automation and mechanization of transshipment processes; improvement of quality and time reduction of fulfilling customs procedures; increase of line capacity at Dostyk – Aktogay station; we intend to electrify and increase line capacity of Aktogay - Almaty section; later on - construction of a second track at the single track line with track insertion Almaty – Shu.

At present, design estimates for construction of the second track is ready, and it will allow to considerably increase the traffic capacity of this section. A new system of centralized traffic control "Neman", developed in Belarus, is being implemented here. The decision of choosing this particular system was conditioned by the fact that its software has an access unlike "Dialogue" system.

If to consider TRACECA section farther, from Shu station towards Tashkent, the traffic capacity is met there though the section's electric centralization is of old relay type. At Almaty - Astana line section Transtelecom is carrying out the construction of a fibre-optical telecommunication system. The program stipulates, first of all, solving of bottlenecks related to information, i.e. communication and railway transportation, i.e. traffic and processing capacity. It will enable us, together with other countries, to form a trans-Asian corridor that will allow to increase transit cargo capacity through the short way from China to Europe.

As regards the development program of the Western region, its infrastructure, it is necessary to note that oil mining and oil refining are very well developed in this region. Therefore, the necessity has arisen, first of all, to increase the traffic capacity of Kandagach - Makat - Kulsary – Aktau line section. According to this program, we have already completed the first stage of modernizing tone rail automatic blocking chain and opening of additional sidings at the line section from Kulsary – Beineu up to Mangyshlak. In the second stage, this system will be extended up to Kandagach station. At present, we have already completed the construction and opened the section that will connect Kandagach with the northern Kazakhstan that will allow to connect them with the Western region through the short way. It will connect oil mining areas with oil refineries in Pavlodar and provide for return deliveries of grain, metals to the Western regions. Besides, Sputnik – Degelen line has also started its operations. This section connects northern regions with southeast regions through the short way. These are the main projects which connect central Kazakhstan with the regions.

¹ The text is transcribed from the record done during the seminar

At present the construction of the TransKazakhstan line is still under consideration. The route of this line will be Dostyk – Aktogay – Sayak - Mointy - Dzhezkazgan – Saksaulskaya, exit to Beineu – Uzen and further up to the border with Turkmenistan. If to talk about the purpose of this project, it is to increase the potential of cargo transit from the Far East to Europe through Kazakhstan.

As I said earlier, we have difficulties at Dostyk station related to transshipment and low line capacity due to gauge difference. We intend to construct a new gauge of 1,435 mm from Dostyk Station up to the border with Turkmenistan and, additionally, to construct a broad gauge at Saksaulskaya – Beineu line that will connect the southern regions of Kazakhstan with the Western one through the short way. The processing factories are located in Atirau, Pavlodar and Shymkent, therefore this line will enable to deliver oil to the processing factories through the short way.

The TransKazakhstan line will enable to modernize the infrastructure of the central parts of Kazakhstan. If to talk in details about the studies of this line, technical and economic parameters, the construction is conditioned by the following main reasons: actual preconditions for increasing international cargo transit through the Republic of Kazakhstan thanks to the opening of the new border pass Dostyk – Alashanhol. Secondly, the international transit corridors crossing the territory of Kazakhstan, do not possess a rather broad network, have a long stretch and do not provide transit traffic through the shortest way. Thirdly, transcontinental corridors, which provide direct connection of the countries of East Europe and western Asia, are almost absent in the territory of Kazakhstan.

According to the conclusion of the Joint Stock Company “Kazzheldortrans”, the most prioritized line section for further development of international transport corridors is Mointy – Aktogay line. Therefore, a conclusion was drawn up that for the development of the transport network in Kazakhstan, the most optimal is a construction of a Transkazakhstan line with a wide and European gauge at the same time. It will enable to solve a number of republican, political and social issues and will also allow to provide favorable conditions for gaining additional transit volumes of transportation.

At present, transit routes with access to Aktau port pass through the northern and southern directions. The northern route, passing from Dostyk station through stations Aktogay, Mointy, Astana, Tobol, Kandagach, Makat, Beineu, Aktau port makes up 3,543 kms. The southern route passing from Dostyk station through stations Aktogaj, Almaty, Arys, Kandagach, Makat, Beineu, Aktau port makes up 4,135 kms. The distance of the TransKazakhstan line will make up 3,070 kms which is almost 500 kms shorter than the Northern route and 1,060 kms shorter than the Southern route. With the average speed of 50 km/h, the passing time of freight traffic through the territory of Kazakhstan will make up about 60 hours or 2,5 days, without taking into account the time for border and customs operations.

In the direction of the projected TransKazakhstan line, there are single-track sections of difficult gauge. These are Aktogay – Dostyk, Aktogay - Mointy, Kyzyl-Jar and Beineu – Aktau sections. Railroad lines between the stations Mointy - Kyzyl-Jar, Dzhezkazgan – Saksaulskaya and Saksaulskaya - Бейнеу, Sai-Utkes – Uzen - state border are absent. The total distance of the existing railroad line of a wide gauge makes up 1,500 kms. We will have to construct again at the stretch of 1,500 kms. The railway line of the European gauge at the sections Dostyk - Aktogay, Aktogay – Mointy, Kyzyl-Jar - Dzhezkazgan and Beineu – Aktau will pass near the existing line of a wide gauge. The section Saksaulskaya – Beineu will be constructed on a new ground bed with its simultaneous embanking for two tracks of the European and wide gauge. At the

sections Dzhezkazgan - Saksaulskaya, Mointy - Kyzyl-Джап, Sai-Utkes – Uzen - the state border it is foreseen the construction of only a single-track line of the European gauge. When constructing narrow gauge tracks at Dostyk station, the line of a new railway section will reach up to Aktogay station.

In total, the following number of engineering structures are to be constructed at the TransKazakhstan line: 1,301 units of small engineering structures, 114 units of medium-size bridges, 14 big metal bridges, grade separation structures - 11 units.

As regards automatic machinery, we intend to install modern shoestrings, new automatic means, telemechanics, communication. For signaling and communication on the TransKazakhstan line it will be necessary to perform the following works: to install microprocessor-based centralization devices - 103 intermediate block points, to construct automatic blocking along 6,000 kms of the section, to lay 3,000 kms of fibre-optic communication lines.

Now, I would like to brief you in more details about our report. The expected results from implementing the project:

Increase in traffic volume – by 35 million tons for transit and by 20 million tons for export.

Between the countries of Asia and Europe – for the total sum of USD 7 million a year.

Between China, Iran and Turkey - consumer goods, mechanical engineering products and building materials to the total sum of USD 2 billion.

Between Russia and the countries of the Near East for the total amount of USD 1 billion.

This is a general overview of this program.

Now I would like to talk more about the general projects of developing railways. Kazakhstan is focused on introducing modern microprocessor-based efficient resource-saving technologies. All the services provided by KTZh in accordance to the accepted modern European standards ISO 2000, ISO 9001 are being introduced on the whole network. Certainly, it is still early to say that they all conform to these standards, but we are working hard in this direction.

If to talk about the means being used in Kazakhstan, communication facilities are developing very well at the moment. An introduction of fibre-optic communication lines, digitization of switches is carried out everywhere. At present, practically all switches are connected into a single network. This year an operative and technological communication has already been digitized at 115 stations. The program foresees continuation of digitizing of operative and technological communication.

As I already said, we have a pilot section which will be automated according to ERTMS and GSM-R standard on the line Dostyk - Aktogay. Testing of this system will be carried out at this line.

The feasibility study for construction and modernization of the existing lines for the TransKazakhstan line has already been completed. The calculations of efficiency were made for the following option: average annual construction volume - 600 kms, considered period - 30 years, including 5 years of construction and 25 years of operation. We plan to invest our own capital for construction: the state fund - 15%, own means of the new national company KTZh - 30%, loans - 82%, i.e. about USD 2.870 million, the total sum is USD 3,5 billion. The efficiency of made investments is calculated for a forecast volume of 1 billion 300 million tons within 29 years, or 38 million tons a year. IRR makes up 13,07%, a pay-back period is 13 years.

RAILWAY DEVELOPMENT PLAN IN KYRGYZSTAN

Kyrgyz railways represent a major component of the industrial infrastructure of the Republic. Its activity is directed on satisfaction of public needs in rail transportation.

The extent of the Kyrgyz railway is 423,9 km: 322, 7 km of it is in the North including the section along Kazakhstan 60,3 km, and in the South 101,2 km. The lines are single-gauge.

Kyrgyz railway is a state enterprise that employs about 5000 person.

One of the main problems for the railway is the absence of railway communication between the North and the South of the Republic. For the lack of a direct service, transportation of cargoes is carried out through Kazakhstan and Uzbekistan. This, in turn, leads to significant increase of transportation costs and terms of cargo delivery.

With the purpose of cardinal solution of the problem in transport maintenance of a coal deposit Kara-Keche, the Government of Kyrgyz Republic has adopted a decision № 642 dated October, 13 2003 "On construction of a railway line Balikchi - Kochkor -Kara - Keche."

Construction of the railway line Balikchi - Kochkor -Kara - Keche is split into two stages where the 1st stage is Balikchi -Kochkor section with extent of 64 km and investment of financial assets in the amount of 29,33 million US dollars, and 2nd stage is Kochkor - Kara -Keche section with extent of 117 km and with the amount of investments 97,98 million US dollars.

To implement the above mentioned decision, the Kyrgyz Railway has already started the construction of the 1st stage of Balikchi - Kochkor- Kara- Keche railway line at the expense of own means.

Construction of the railway line is an extremely important step in the development of country's economy, in formation of own fuel-raw-material base to ensure energy independence and increase of reliability of fuel power complex. It will also enable to increase the volume of coal mining deposit Kara-Keche with the purpose of maximum possible replacement of imported energy carriers with local cheap coal; it will create additional workplaces both on the railway and on a coal deposit and adjacent territories.

Along with the economic and ecological benefits, the construction of railway line Balikchi - Kochkor- Kara- Keche has a strategically great value for Kyrgyz republic from the point of view of solving the main transport problem - formation transrepublican line North-South (in the direction Balikchi - Djalal-Abad) with exit to China.

Construction of the railway with exit to China is of a huge value not only for Kyrgyzstan, but also will give doubtless benefits to the neighboring states.

According to preliminary authorized variant of passage of a line, the total extent of the route with exit to China is 433,4 km, including 268, 4 km on the territory of Kyrgyz Republic and 165 km on the territory of China. The estimated cost of construction including rolling stock cost amounts 1049,0 million USD.

In addition to railway construction, one of the points of perspective development of Kyrgyz railway is electrification of Lugovaya - Bishkek - Balickchi section. Switching of Lugovaya - Bishkek - Balickchi section on electric traction will allow not only to lower working costs, including consumption of power resources, raise capacity of locomotives and locomotive brigades by increase of train weight, but will also solve the issue of environment preservation. Besides, switching to electric traction will allow using the electric power for locomotives that will considerably lower the cost of transportation. Preliminary cost of electrification of Lugovaya - Bishkek - Balickchi section is 128,15 million USD.

Taking into account, that development of Kyrgyz economy and foreign trade relations require carrying out of the coordinated transport policy of international transport corridors development, Kyrgyz railway supporting regional integration processes, is the participant of:

- Central Council on railway transportation of the state-participants of the Commonwealth and Baltic states.
- Organization for Cooperation in railways (OSJD)
- Organization of Economic Cooperation

Within the framework of these organizations, railway administrations solve the general issues and are guided by uniform normative documents on international cargo and passenger transportations tariffs.

Bilateral and multilateral agreements on coordination of railway transport activity were concluded with the neighboring states. Also, Kyrgyz railway takes part in realization of railway issues adopted in the frames of Eurasian economic society and Central - Asian Cooperation.

Session 4

Railway development plan in Uzbekistan

UTY

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Session 4

Railway development plan in Tajikistan

Tajikistan Railways/MOT

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NATIONAL DEVELOPMENT PLAN IN UZBEKISTAN

The Government of the Republic of Uzbekistan attaches big attention to upgrading technical and financial state of railways with a view of comprehensive development of new deposits of minerals, improvement of railway transportation and formation of a single railway network of the Republic of Uzbekistan. During the years of independence, a new railway line Uchkuduk - Misken - Nukus with 341 kms of length was built up and put into operation. The construction of a new line Guzar - Boysun – Kumkurgan with 220 kilometers of length has also started. Operation of new railway lines will give an impetus to the development of under-developed areas of the existing mining and processing industry and will provide additional workplaces to the local population.

A start-up of a new high-speed express electric train "Registan" en route Tashkent – Samarkand has become a big event of this year. The express train covers the distance of 360 kms for only 3 hours and 50 minutes. Nowadays, we are working at reducing this time to 3.5 hours. A start-up of a high-speed passenger transportation is a vivid example of cooperation among the three countries - China, Russia and Uzbekistan - in the field of railway transportation.

In 2002, within the framework of the Governmental program on privatization and transformation of state property, the following railway transport enterprises have been privatized and transformed into joint-stock companies: the State Stock Railway Company "Uzbekiston Temir Yullari", "Uzzheldorpass", branch company "Uzzheldorkonteiner", Production Enterprise "Uzremvagon", "Dorrefrans" and Tashkent facility for repair of passenger coaches, that are 51% owned by the state with 10% of the actions belonging to the personnel and the remaining 39% earmarked for sale to foreign investors.

A prioritized activity of the company is implementation of investment projects: upgrading of communication facilities through application of fibre-optical lines, purchase of a new rolling stock - electric locomotives and carriages as well as modernization of the existing lines, construction of new railway lines and formation of a single railway network in the republic, electrification of the railway, implementation of projects for thorough repairs of the lines, manufacturing of a permanent way elements and spare parts at the company's plants .

In 2001, Tashkent Plant on Carriages' Repair was put into operation. The project began in 1996 when the government of Uzbekistan and the Japanese International Economic Cooperation Fund signed a credit agreement.

A complete reconstruction of a line section of 320 kms in length on Chengeldy - Samarkand line was carried out under the project "Railways Rehabilitation in Uzbekistan" (a loan of the Asian Development Bank - 70 million US dollars).

The project "Railways Modernization in Uzbekistan" (a loan of the Asian Development Bank - 70 million US dollars and OPEC Fond for 5 mln. US dollars) will allow to upgrade 341 kms of the line Jizzak – Samarkand – Bukhara – Khodjadavlet.

The European Bank for Reconstruction and Development contributes a significant share to the development of a railway transportation in Uzbekistan. Together with EBRD, the National State Railway Company "Uzbekiston Temir Yullari" is implementing such joint projects as "Upgrading of locomotives fleet" and "Modernization of diesel locomotives fleet".

Within the project "Upgrading of locomotives fleet", the National State Railway Company "Uzbekiston Temir Yullari" received 12 new electric locomotives from Chjuchjou Electric Locomotives Building Plant (People's Republic of China).

Within the project "Modernization of diesel locomotives fleet", the National State Railway Company "Uzbekiston Temir Yullari" and the European Bank for Reconstruction and Development signed a loan agreement for purchase on a tender basis of diesel-generating installations sets and auxiliary equipment, comprehensive modernization of 90 sections of diesel locomotives of TЭ10 type as well as reconstruction and full re-equipment of a foundry shop at "Uzzheldorremmash".

The contract and the guarantee agreement under the Project of Facilitation of Restructuring of the National State Railway Company "Uzbekiston Temir Yullari" between this company and the European Bank for Reconstruction and Development envisage restructuring and privatization of the railway transportation in Uzbekistan. The realization of the project is to be financed through the EBRD's gratuitous loan in the amount of 1 million Euro.

The Government of the Republic of Uzbekistan and the Government of the Federal Republic of Germany signed an agreement on financial cooperation according to which the Government of FRG will allocate a loan for financing an investment project on electrification of Tashkent - Angren line section.

The National State Railway Company "Uzbekiston Temir Yullari" and the United States Agency on Trade and Development signed an agreement for loan provision to the amount of 862 thousand US dollars for financing a feasibility study for projects on electrification and modernization of railways telecommunications in the Republic of Uzbekistan.

Foreign countries also render their assistance in developing railways in Uzbekistan. In December 2002, the Government of France allocated a loan for assisting the National State Railway Company "Uzbekiston Temir Yullari" in forming its own consulting group. For this purpose, a consortium of French companies SNCF International, ALSTOM Transport and AXIS under the National State Railway Company "Uzbekiston Temir Yullari" provided a training for 6 experts of the company on methods of developing, drawing up and presenting railway projects and tenders as well as on procedures for monitoring the projects.

The international experience shows that competition with other types of transport with the purpose of attracting additional freight traffic, compels railways to work continuously for improving transport services provided to cargo owners, upgrading level of services, broadening of a spectrum of services provided. At present, the transport market faces, first of all, the problems of conformity of prices to transport services, and also transport marketing. Such a situation happened, mainly, due to the increased requirements of the railway transportation clients towards the quality of services provided.

The National State Railway Company "Uzbekiston Temir Yullari" successfully cooperates with such international organizations as the Union International des Chemins of Fer (UIC, France), the United Nations Economic and Social Commission for Asia Pacific Region and Central Asia (UNESCAP, Thailand), Organization for the Cooperation in Railways (OSJD, Poland), Economic Cooperation Organization (ECO, Iran), Railway Transport Council of CIS_member-countries, Latvia, Lithuania and Estonia.

The experts of the National State Railway Company "Uzbekiston Temir Yullari" take part in the meetings of the Economic Cooperation Organization (ECO) on railway transport. The start-up of a container train in the ECO region en route Almaty - Istanbul and Akaltyn - Bandar Abbas port (Iran) is one of the main projects being carried out by this Organization.

Within the framework of participation of the National State Railway Company "Uzbekiston Temir Yullari" in the projects under TRACECA Program, a constant work is carried out on reviving and operating TRACECA corridor to its full capacity. For the purpose of increasing the traffic, the company follows a flexible tariff policy.

Taking into account the international importance of providing transportation of humanitarian cargo to Afghanistan and the position of the Republic of Uzbekistan on this issue as well as with a view of maximal usage of transit potential of our railway, the National State Railway Company "Uzbekiston Temir Yullari" did not stop and will continue to render services on transportation of wagons with humanitarian and commercial cargo through the border Galaba – Khairaton.

The European Union Commission allocated a grant to the amount of 2 million Euro for implementing a project "Equipment Delivery and Reconstruction of a Railway Line Section Termez – Galaba". The implementation of this project will facilitate uninterrupted transportation of cargo to Afghanistan.

As it is seen from the aforesaid, presently the National State Railway Company "Uzbekiston Temir Yullari" is able to fulfil any task on transportation of cargo and passengers up to the mark through the projects implemented step by step.

Session 5

Activities for the remaining of the Project

A project implemented by 

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Session 5

Selection of sections to be submitted to feasibility study under module B

P.Pezant, A.Veralli

A project implemented by 

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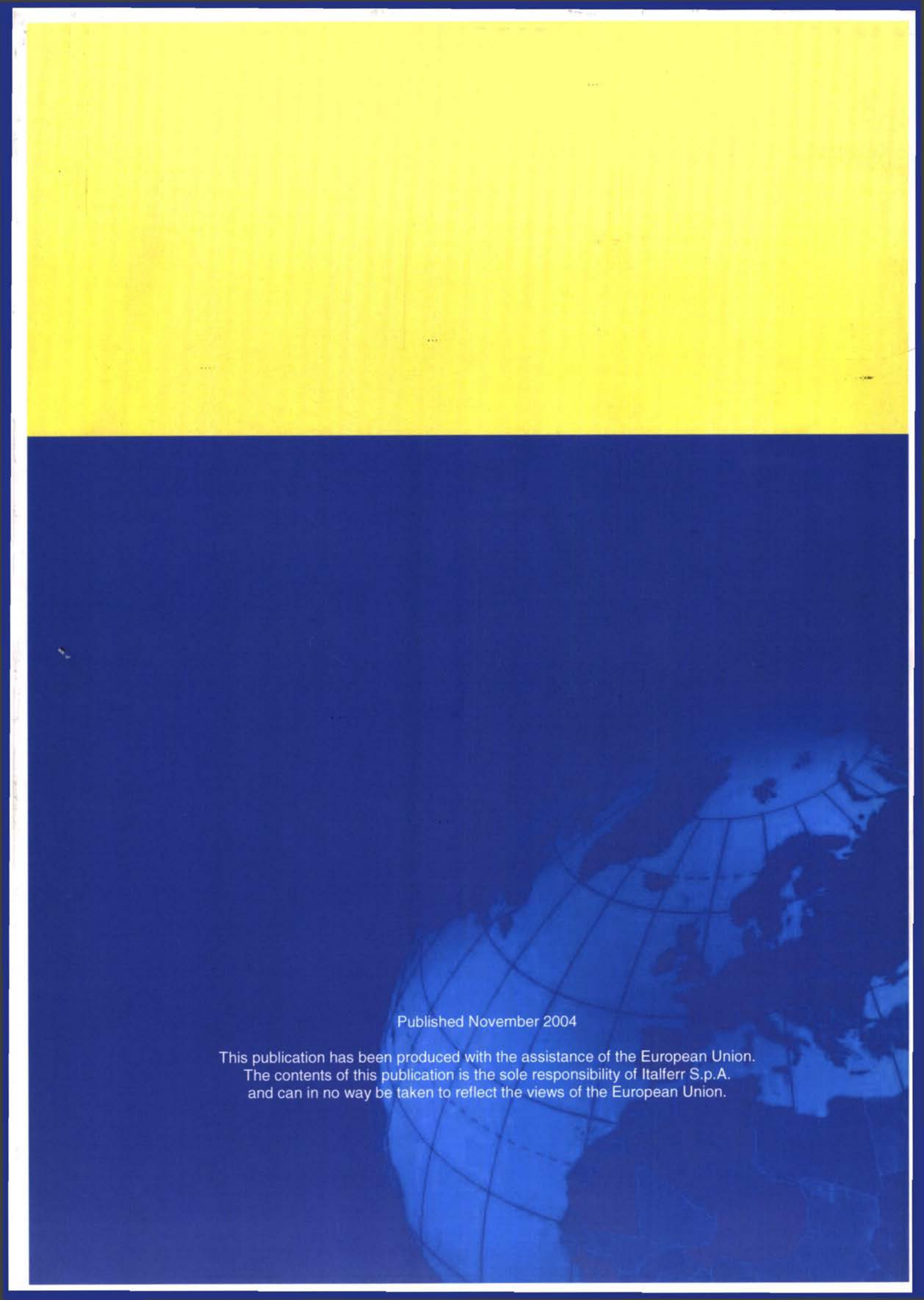


Session 5 / Selection of sections to be submitted to FS

- The ToRs state that the following important railway sections had already been identified by the beneficiary countries as candidates to a review of their technical and economic justification under Module B:
 - Jalal-Abad – Kara-Su – Andijan (Kyrgyzstan and Uzbekistan)
 - Osh – Kara-Su – Andijan (Kyrgyzstan and Uzbekistan)
 - Lugovaya – Bishkek – Balykchi (Kyrgyzstan and Kazakhstan)
 - Aktau – Beyneu – Kungrad (Kazakhstan and Uzbekistan).
- According to the ToRs the above list should be verified during Module A. It is worth mentioning that ToRs didn't specify criteria to be used for the selection.

Session 5 / Selection of sections to be submitted to FS

- In the Inception Report, the Consultant has expressed the idea that Beneficiary acceptance is to be the main criteria together with being in the TRACECA corridor.
- In summary the Consultants have undertaken feasibility studies for three railway sections:
 - Lugovaya – Bishkek – Balykshi in Kyrgyz Republic;
 - Kungrad – Karakalpakia (Kazakh border) in Uzbekistan;
 - Beineu – Oasis (Uzbek border) in Kazakhstan.



Published November 2004

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