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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on Transport Statistics
(Fifty-third session, 25-27 November 2002,
agenda item 7 (b))

TRANSPORT DATABASE AND INFORMATION SYSTEMS DEVELOPMENT

Status report on the Trans-European Railway (TER) Project Database

Transmitted by the secretariat

Note: The Working Party, at its fifty-second session, expressed interest in following progress made in the application of the geographic information system (GIS) in the railway transport sector. With this in mind, the Project Central Office of the Trans-European Railway (TER) Project wishes to inform the Working Party about the developments on GIS within the TER Project. The relevant information is reproduced below.

* * * *

REPORT ON TER (TRANS-EUROPEAN RAILWAY) DATABASE AND MAPPING ACTIVITY

A.   TER database

The TER Database is meant to cover all 16-member countries as well as several observer countries in TER (annex 1). The aim of this database is to provide the necessary data for the preparation of pre-feasibility studies, assessment of investments, facilitation of railway border crossings, etc., for upgrading and modernization of the TER lines in the member countries.

It also enables TER to cooperate with other Transport Information bodies and organizations like UNECE-Transport Statistics, UIC, Pan-European corridors' secretariats, etc.

TER database upon the end of 2001 is a collection of distinct Excel files for each type of data (entity).

At present TER Database is built for Access Database. The structure of the database was obtained from the Conceptual Data Model created using the tool Sybase Power Designer 8. As a result the database can be translated to any main database management system known (like Oracle, Microsoft SQL, etc.).

The diagram of the Conceptual Data Model is presented in annex 2. The list of the data fields of the TER database is presented in annex 3.

TER Database contains four main groups of data:

1. Data for basic railway indicators and social information;

2. Data for infrastructure: line sections, bridges, tunnels, overpasses, and level crossings;

3. Operational data;

4. Data regarding transport equipment (cars, wagons, locomotives and railcars).

In order to facilitate the use of database a reporting application has been developed by the PCO and will be distributed to the TER member countries. The application was developed using Windows NT4.0 as operating system and Microsoft Visual Basic 6.0 and Crystal Reports 4.6 for Visual Basic as developing environment. The application provides over 70 different reports and can be developed according to the needs of the end users.

A list of main technical characteristics for TER lines is presented in annex 4.

(i)   TER GIS mapping

For GIS Mapping System, MapInfo Professional version 6 is used.

The maps offer the possibilities to view, analyze and print images and views for TER Border Crossing Railway Stations, the TER / AGC / AGTC lines and their line sections as well as projects prepared for implementation and identified per corridor in various countries.

All these maps cover the whole TER region, separate member countries, selected areas, Pan-European corridors, etc.

The present GIS collection provides a lot of maps carried out in different analytical views that can be used for further data analysis.

The TER GIS maps are two dimensional, and can be grouped at present into the following:

1. TER member countries;

2. AGC, AGTC, TER lines;

3. TER network;

4. TER sections on the TER network;

5. TER border stations;

6. Projects for rehabilitation of the railway lines identified per corridor;

7. Pan-European corridors overlapping TER network.

All these maps were drawn on the basis of the information stored in the TER database.
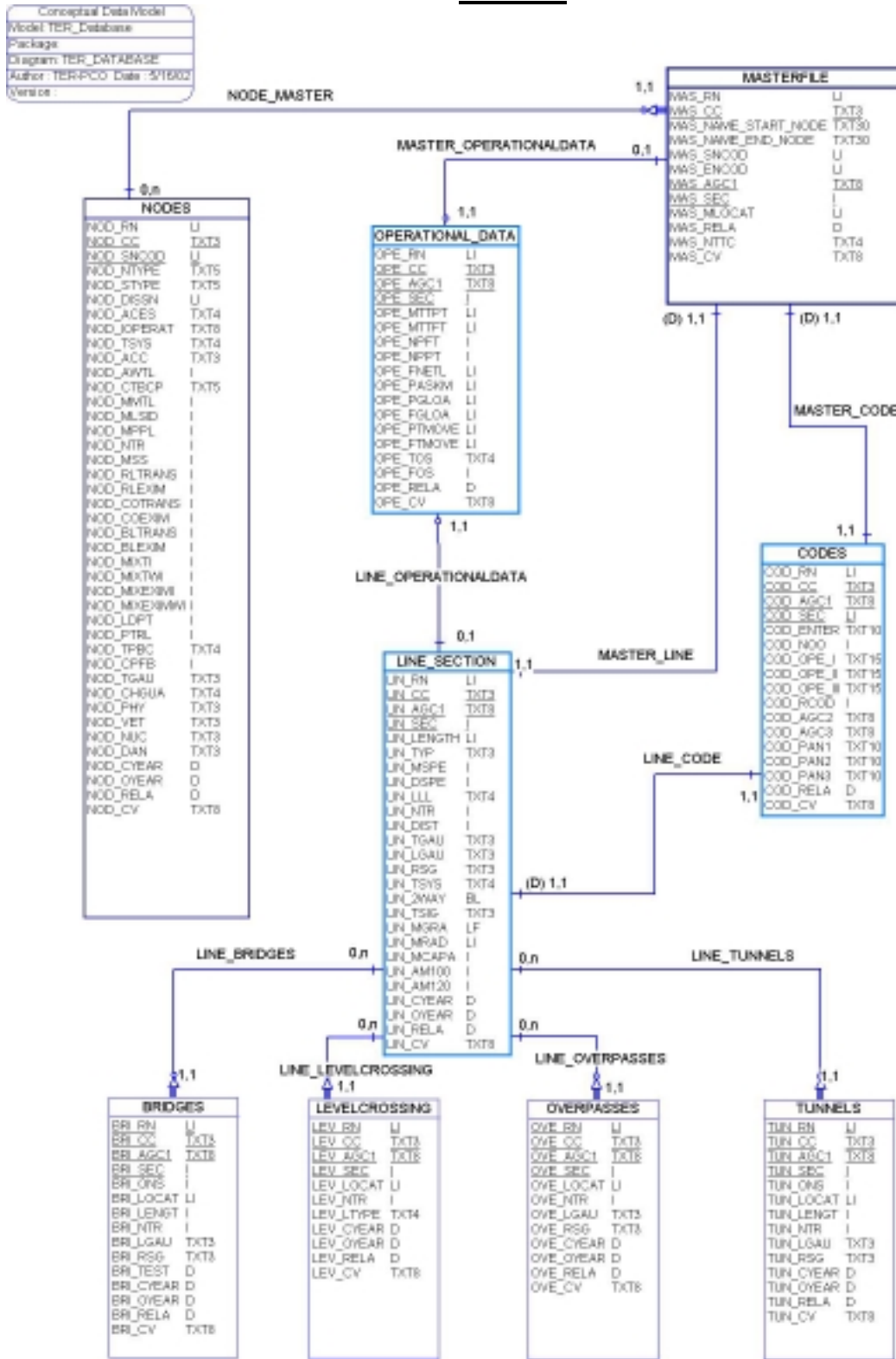
At present, data continues to be processed and imported from Access database into MapInfo for all the countries that provided updated data.

Under preparation is a meeting of data experts to update the structure of the data collection in a way that will serve better the needs of the TER member countries.

Annex 1

List of member and observer TER countries

#	Abbr.2	Abbr.3	Short Name	Full Name	Status
1	AT	AUT	AUSTRIA	Republic of Austria	Member
2	BA	BIH	BOSNIA and HERZEGOVINA	Bosnia and Herzegovina	Member
3	BG	BGR	BULGARIA	Republic of Bulgaria	Member
4	BY	BLR	BELARUS	Belarus	Observer
5	CZ	CZE	CZECH REPUBLIC	Czech Republic	Member
6	GE	GEO	GEORGIA	Georgia	Member
7	GR	GRC	GREECE	Hellenic Republic	Member
8	HR	HRV	CROATIA	Republic of Croatia	Member
9	HU	HUN	HUNGARY	Republic of Hungary	Member
10	IT	ITA	ITALY	Italian Republic	Member
11	LT	LTU	LITHUANIA	Republic of Lithuania	Member
12	LV	LVA	LATVIA	Republic of Latvia	Observer
13	MD	MDA	MOLDOVA	Republic of Moldova	Observer
14	MK	MKD	FYROM	THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	Observer
15	PL	POL	POLAND	Republic of Poland	Member
16	RO	ROU	ROMANIA	Romania	Member
17	RU	RUS	RUSSIAN FEDERATION	Russian Federation	Member
18	SK	SVK	SLOVAKIA	Slovak Republic	Member
19	SL	SLE	SLOVENIA	Republic of Slovenia	Member
20	TR	TUR	TURKEY	Republic of Turkey	Member
21	UA	UKR	UKRAINE	Ukraine	Observer

Annex 2

Conceptual Data Model

Model: TER_Database	
Package:	
Diagram: TER_DATABASE	
Author: TER-PCO Date: 5/16/02	
Version:	

NODE_MASTER

MASTER_OPERATIONALDATA

MASTERFILE 1,1

MAS_RN	LI
MAS_CC	TXT3
MAS_NAME_START_NODE	TXT30
MAS_NAME_END_NODE	TXT30
MAS_SNCOD	U
MAS_ENCOD	U
MAS_AGC1	TXT9
MAS_SEC	I
MAS_MLOCAT	U
MAS_RELA	D
MAS_NTTC	TXT4
MAS_CV	TXT8

0,1

0,n

NODES

NOD_RN	LI
NOD_CC	TXT3
NOD_SNCOD	U
NOD_NTYPE	TXT5
NOD_STYPE	TXT5
NOD_DISSN	U
NOD_ACES	TXT4
NOD_IOPERAT	TXT6
NOD_TSYS	TXT4
NOD_ACC	TXT3
NOD_AWTL	I
NOD_CTBCP	TXT5
NOD_MWTL	I
NOD_MLSID	I
NOD_MPPL	I
NOD_NTR	I
NOD_MSS	I
NOD_RLTRANS	I
NOD_RLEXIM	I
NOD_COTRANS	I
NOD_COEXIM	I
NOD_BLTRANS	I
NOD_BLEXIM	I
NOD_MIXTI	I
NOD_MIXTWI	I
NOD_MIXEXIMI	I
NOD_MIXEXIMWI	I
NOD_LDPT	I
NOD_PTRL	I
NOD_TPBC	TXT4
NOD_CPFB	I
NOD_TGAU	TXT3
NOD_CHGUA	TXT4
NOD_PHY	TXT3
NOD_VET	TXT3
NOD_NUC	TXT3
NOD_DAN	TXT3
NOD_CYEAR	D
NOD_OYEAR	D
NOD_RELA	D
NOD_CV	TXT8

OPERATIONAL_DATA 1,1

OPE_RN	LI
OPE_CC	TXT3
OPE_AGC1	TXT3
OPE_SEC	I
OPE_MTTPT	LI
OPE_MTTFT	LI
OPE_NPFT	I
OPE_NPPT	I
OPE_FNETL	LI
OPE_PASKM	LI
OPE_PGLOA	LI
OPE_FGLOA	LI
OPE_PTMOVE	LI
OPE_FTMOVE	LI
OPE_TOS	TXT4
OPE_FOS	I
OPE_RELA	D
OPE_CV	TXT8

(D) 1,1

(D) 1,1

MASTER_CODE

CODES 1,1

COD_RN	LI
COD_CC	TXT3
COD_AGC1	TXT3
COD_SEC	LI
COD_ENTER	TXT10
COD_NOO	I
COD_OPE_I	TXT15
COD_OPE_II	TXT15
COD_OPE_III	TXT15
COD_RCOD	I
COD_AGC2	TXT3
COD_AGC3	TXT3
COD_PAN1	TXT10
COD_PAN2	TXT10
COD_PAN3	TXT10
COD_RELA	D
COD_CV	TXT8

LINE_OPERATIONALDATA

0,1

LINE_SECTION 1,1

LIN_RN	LI
LIN_CC	TXT3
LIN_AGC1	TXT3
LIN_SEC	I
LIN_LENGTH	LI
LIN_TYP	TXT3
LIN_MSPE	I
LIN_DSPE	I
LIN_LLL	TXT4
LIN_NTR	I
LIN_DIST	I
LIN_TGAU	TXT3
LIN_LGAU	TXT3
LIN_RSG	TXT3
LIN_TSYS	TXT4
LIN_2WAY	BL
LIN_TSIG	TXT3
LIN_MGRA	LF
LIN_MRAD	LI
LIN_MCAPA	I
LIN_AM100	I
LIN_AM120	I
LIN_CYEAR	D
LIN_OYEAR	D
LIN_RELA	D
LIN_CV	TXT8

MASTER_LINE 1,1

LINE_CODE 1,1

(D) 1,1

LINE_BRIDGES 0,n

LINE_TUNNELS 0,n

LINE_LEVELCROSSING 0,n

LINE_OVERPASSES 0,n

1,1

BRIDGES

BRI_RN	LI
BRI_CC	TXT3
BRI_AGC1	TXT3
BRI_SEC	I
BRI_ONS	I
BRI_LOCAT	LI
BRI_LENGT	I
BRI_NTR	I
BRI_LGAU	TXT3
BRI_RSG	TXT3
BRI_TEST	D
BRI_CYEAR	D
BRI_OYEAR	D
BRI_RELA	D
BRI_CV	TXT8

1,1

LEVELCROSSING

LEV_RN	LI
LEV_CC	TXT3
LEV_AGC1	TXT3
LEV_SEC	I
LEV_LOCAT	LI
LEV_NTR	I
LEV_LTYPE	TXT4
LEV_CYEAR	D
LEV_OYEAR	D
LEV_RELA	D
LEV_CV	TXT8

1,1

OVERPASSES

OVE_RN	LI
OVE_CC	TXT3
OVE_AGC1	TXT3
OVE_SEC	I
OVE_LOCAT	LI
OVE_NTR	I
OVE_LGAU	TXT3
OVE_RSG	TXT3
OVE_CYEAR	D
OVE_OYEAR	D
OVE_RELA	D
OVE_CV	TXT8

1,1

TUNNELS

TUN_RN	LI
TUN_CC	TXT3
TUN_AGC1	TXT3
TUN_SEC	I
TUN_ONS	I
TUN_LOCAT	LI
TUN_LENGT	I
TUN_NTR	I
TUN_LGAU	TXT3
TUN_RSG	TXT3
TUN_CYEAR	D
TUN_OYEAR	D
TUN_RELA	D
TUN_CV	TXT8

Conceptual Data Model
Model: TER_Database
Package:
Diagram: TER_DATABASE
Author : TER-PCO Date : 5/16/02
Version :

LOCOMOTIVESRAILCARS	
LOC_RN	LI
LOC_CC	TXT3
LOC_LRCARCOD	TXT5
LOC_TYPV	TXT3
LOC_ENTE2	TXT4
LOC_TNLR	I
LOC_TNNLR	I
LOC_TDRIVE	TXT6
LOC_BLENG	I
LOC_WGAU	I
LOC_MAL	I
LOC_MSPE	I
LOC_RELA	D
LOC_CV	TXT8

COACHES	
COA_RN	LI
COA_CC	TXT3
COA_CCOD	I
COA_TYPC	TXT4
COA_ENTE2	TXT4
COA_TNCO	LI
COA_TNNICO	LI
COA_BLENG	I
COA_WGAU	I
COA_MAL	I
COA_MSPE	I
COA_RELA	D
COA_CV	TXT8

WAGONS	
WAG_RN	LI
WAG_CC	TXT3
WAG_WCOD	TXT1
WAG_TYPW	TXT3
WAG_ENTE2	TXT10
WAG_TNWA	LI
WAG_TNNWA	LI
WAG_BLENG	I
WAG_WGAU	I
WAG_MAL	I
WAG_MSPE	I
WAG_RELA	D
WAG_CV	TXT8

GENERAL	
GEN_RN	LI
GEN_CC	TXT3
GEN_NC	TXT20
GEN_SC	LI
GEN_ISUM	LI
GEN_GDP	LI
GEN_FG_GDP	LF
GEN_TLENGT	LI
GEN_NPTY	LI
GEN_PKM	LI
GEN_FGPT	LF
GEN_TONNE	LI
GEN_FTKM	LI
GEN_FGFREIT	LF
GEN_TNUMRW	LI
GEN_RELA	D
GEN_CV	TXT8

COMBINEDTRANSPORT	
COM_RN	LI
COM_CC	TXT3
COM_ENTE3	TXT10
COM_TNTEUEXP	LI
COM_TWEXP	LI
COM_TNTEUIMP	LI
COM_TWIMP	LI
COM_TNTEUTRAN	LI
COM_TWTRAN	LI
COM_DOR1	TXT3
COM_DOR2	TXT3
COM_DOR3	TXT3
COM_DOR4	TXT3
COM_DOR5	TXT3
COM_RELA	D
COM_CV	TXT8

Annex 3

List of database fields

1. Master file

    1.1.   Record Number
    1.2.   Country Code
    1.3.   National Time Table Code
    1.4.   Name of Start Node of the Line Section
    1.5.   Name of End Node of the Line Section
    1.6.   Start Node Code
    1.7.   End Node Code
    1.8.   AGC or TER Line Code
    1.9.   Section code
    1.10. Main Location of the Start Node
    1.11. Data relate to Year
    1.12. Control Value

2. General data per Country

    2.1.   Record Number
    2.2.   Country Code
    2.3.   Name of the Country
    2.4.   Size of the Country
    2.5.   Number of Inhabitants in the Country
    2.6.   Gross Domestic Product (GDP)
    2.7.   Foreseen growth of the (GDP)
    2.8.   Total length of the rail network (Km)
    2.9.   Number of Passengers travelling by rail per year
    2.10. Number of passenger's kilometers per year
    2.11. Foreseen growth of the rail passenger transport
    2.12. Number of tones transported by rail per year
    2.13. Number of tone kilometers realized per year
    2.14. Foreseen growth of the rail freight transport
    2.15. Total number of railway workers
    2.16. Data Relate to Year
    2.17. Control Value

3. Code file

    3.1.   Record Number
    3.2.   Country Code
    3.3.   AGC or TER Line Code
    3.4.   Section Code
    3.5.   Railway Enterprise
    3.6.   Number of the Railway service Operator
    3.7.   Railway Service Operator-I.
    3.8.   Railway Service Operator-II.
    3.9.   Railway Service Operator-III.
    3.10. Railway Code
    3.11. AGC or TER Line Code
    3.12. AGC or TER Line Code
    3.13. Pan European Transport Code

3.14.   Pan European Transport Code
3.15.   Pan European Transport Code
3.16.   Data Relate to Year
3.17.   Control Value

4.   Line section File

4.1.   Record Number
4.2.   Country Code
4.3.   AGC or TER Line Code
4.4.   Section code
4.5.   Length of Line Section
4.6.   Type of Line Section
4.7.   Max. Speed Allowed by the Track
4.8.   Design Speed
4.9.   Load Limits for Railway Lines
4.10.   Number of Tracks
4.11.   Distance between Axes of Tracks
4.12.   Track Gauge
4.13.   Loading Gauge
4.14.   Rail Structure gauge
4.15.   Traction System
4.16.   Two-way Direction Operation
4.17.   Type of signaling
4.18.   Max. Gradient
4.19.   Min. Radius of Curve
4.20.   Max. Capacity of Line Section
4.21.   Authorized mass per axle wagons < 100 km/h
4.22.   Authorized mass per axle wagons < 120 km/h
4.23.   Construction year of the Line Section
4.24.   Year of Last Main Overhaul of Line Section
4.25.   Data relate to Year
4.26.   Control Value

5.   Nodes

5.1.   Record Number
5.2.   Country Code
5.3.   Start Node Code
5.4.   Node Type
5.5.   Station type
5.6.   Distance of the Node from the Main AGC or TER Line
5.7.   Access to the station
5.8.   Intermodal operation
5.9.   System of traction on Border Station & on Border
        tracks
5.10.   Abbreviation of the Connected Country
5.11.   Average truck-waiting time
5.12.   Combined Transport Border Crossing Possibilities
5.13.   Minimum Main Track Length
5.14.   Minimum Siding (Track) Length
5.15.   Minimum (Main) Passenger Platform Length
5.16.   Number of Tracks
5.17.   Maximum Speed on Switches
5.18.   RO-LA Transit Trains
5.19.   RO-LA Export or Import Trains
5.20.   Combined Transit Transport

5.21.   Combined Export or Import Transport
5.22.   Block or Shuttle Trains Transit
5.23.   Block or Shuttle Export or Import Trains
5.24.   Mixed Freight Transit Trains Inspected
5.25.   Mixed Freight Transit Trains without Inspection
5.26.   Mixed Freight Trains Export or Import Inspected
5.27.   Mixed Freight Trains Export or Import without
         Inspection
5.28.   Processing Time for Passenger Long Distance Trains
5.29.   Processing Time for Passenger Regional or Local
         Trains
5.30.   Type of Passenger Border Control
5.31.   Customs Procedure for Freight on the Border
5.32.   Track Gauge
5.33.   Change of gauge
5.34.   Phytosanitar Inspection
5.35.   Veterinary Inspection
5.36.   Nuclear safety Inspection
5.37.   Dangerous Goods Transported across the border
5.38.   Construction year of the Node
5.39.   Year of Last Main Overhaul of Node
5.40.   Data Relate to Year
5.41.   Control Value

6.   Bridges

6.1.   Record Number
6.2.   Country Code
6.3.   AGC or TER Line Code
6.4.   Section Code
6.5.   Order Number of the parallel railway Structure
6.6.   Location from the Start Node of the Line Section
6.7.   Length of Bridge
6.8.   Number of Tracks
6.9.   Loading Gauge
6.10.   Rail Structure Gauge
6.11.   Test Train
6.12.   Construction year of the Bridge
6.13.   Year of Last Main Reconstruction of Bridge
6.14.   Data Relate to Year
6.15.   Control Value

7.   Tunnels

7.1.   Record Number
7.2.   Country Code
7.3.   AGC or TER Line Code 1
7.4.   Section Code
7.5.   Order Number of the parallel railway Structure
7.6.   Location from the Start Node of the Line Section
7.7.   Length of the Tunnel
7.8.   Number of Tracks
7.9.   Loading Gauge
7.10.   Rail Structure Gauge
7.11.   Construction year of the Tunnel
7.12.   Year of Last Main Reconstruction of Tunnel
7.13.   Data Relate to Year

7.14.   Control Value

8.   Overpasses

8.1.   Record Number
8.2.   Country Code
8.3.   AGC or TER Line Code 1.
8.4.   Section Code
8.5.   Location from the Start Node of the Line Section
8.6.   Number of Tracks
8.7.   Loading Gauge
8.8.   Rail Structure Gauge
8.9.   Construction year of the Overpass
8.10.   Year of Last Main Reconstruction of Overpass
8.11.   Data Relate to Year
8.12.   Control Value

9.   Level crossings

9.1.   Record Number
9.2.   Country Code
9.3.   AGC or TER Line Code 1.
9.4.   Section Code
9.5.   Location from the Start Node of the Line Section
9.6.   Number of Tracks
9.7.   Type of Protection of Crossing
9.8.   Construction Year of the Level Crossing
9.9.   Year of Last Main Overhaul of Level Crossing
9.10.   Data Relate to Year
9.11.   Control Value

10.   Operational data

10.1.   Record Number
10.2.   Country Code
10.3.   AGC or TER Line Code 1.
10.4.   Section Code
10.5.   Minimum Travel Time for Passenger Trains
10.6.   Minimum Travel Time for Freight Trains
10.7.   Number of Present Freight Train
10.8.   Number of Present Passenger Train
10.9.   Freight Net Load
10.10.   Passenger - km per year
10.11.   Passenger Gross Load
10.12.   Freight Gross Load
10.13.   Passenger Train Movements
10.14.   Freight Train Movements
10.15.   Type of service
10.16.   Frequency of service
10.17.   Data Relate to Year
10.18.   Control Value

11.   Locomotives or Railcar

11.1.   Record Number
11.2.   Country Code

    11.3.   Locomotives / Railcars Code
    11.4.   Type of Locomotives / Railcars
    11.5.   Railway Enterprise Code 2.
    11.6.   Total Number of the owned Locomotives /
             Railcars by Railway Enterprise
    11.7.   Total Number of the Not owned Locomotives /
             Railcars by Rail. Enterprise
    11.8.   Type of Power Driven
    11.9.   Length over Buffers
    11.10.   Wheel set Gauge
    11.11.   Maximum Axle Load
    11.12.   Maximum Speed
    11.13.   Data Relate to Year
    11.14.   Control Value

12.   Coaches

    12.1.   Record Number
    12.2.   Country Code
    12.3.   Coach Code
    12.4.   Type of Coach
    12.5.   Railway Enterprise Code 2
    12.6.   Total number of the owned coaches by the
             Rail. Enterprise
    12.7.   Total number of the Not owned coaches by the
             Rail. Enterprise
    12.8.   Average Length over Buffers
    12.9.   Wheel set Gauge
    12.10.   Maximum Axle Load
    12.11.   Maximum Speed
    12.12.   Data relate to Year
    12.13.   Control Value

13.   Wagons

    13.1.   Record Number
    13.2.   Country Code
    13.3.   Wagon Code
    13.4.   Type of Wagon
    13.5.   Railway Enterprise Code 2.
    13.6.   Total Number of the owned Wagons by the
             Railway Enterprises
    13.7.   Total Number of the Not owned Wagons by the
             Rail Enterprises
    13.8.   Average Length over Buffers
    13.9.   Wheel set Gauge
    13.10.   Maximum axle load
    13.11.   Maximum speed
    13.12.   Data relate to Year
    13.13.   Control Value

14.   Combined Transport Quantity

    14.1.   Record Number
    14.2.   Country Code
    14.3.   Railway Enterprise Code 3.
    14.4.   Total number of TEU Export

```
14.5.    Total weight of Combined Transport Export
14.6.    Total number of TEU Import
14.7.    Total weight of Combined Transport Import
14.8.    Total number of TEU Transit
14.9.    Total weight of Combined Transport Transit
14.10.   Definition of route (relation-1)  Start Node 1
14.11.   Definition of route (relation-2)  End  Node  1
14.12.   Definition of route (relation-3)  Via   Node 1
14.13.   Definition of route (relation-4)  Via   Node 2
14.14.   Definition of route (relation-5)  Via   Node 3
14.15.   Data relate to Year
14.16.   Control Value
```

Annex 4

BASIC LENGTHS OF THE TER LINES					
	TOTAL LENGTH OF THE TER LINES	TOTAL LENGTH OF THE TER ELECTRIFIED LINES	TOTAL LENGTH OF THE TER NON-ELECTRIFIED LINES	TOTAL LENGTH OF THE TER SINGLE TRACK LINES	TOTAL LENGTH OF THE TER DOUBLE TRACK LINES
Austria	2651	2436	215	1210	1441
Bosnia and Herzegovina	405	405	0	310	95
Bulgaria	2509	2008	501	1667	842
Croatia	1502	856	646	1259	243
Czech Republic	2349	2110	239	732	1617
Hungary	2574	2228	346	1412	1162
Lithuania	847	103	744	565	282
Poland	4813	4652	161	613	4200
Romania	3514	2357	1157	1456	2058
Russian Federation	1819	1819	0	32	1787
Slovakia	1005	985	20	179	826
Slovenia	604	483	121	274	330
Turkey	3985	1523	2462	3673	312
TOTAL LENGTH	**28577**	**21965**	**6612**	**13382**	**15195**

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