



**MEDITERRANEAN
RAIL FREIGHT CORRIDOR**
Spain-France-Italy-Slovenia-Croatia-Hungary

Identified train length priority intervention according to Transport Market Study and Corridor Customer needs

(Final report of the analysis on train length)



Co-financed by the European Union
Connecting Europe Facility

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1. Executive Summary

The aim of this report is to analyse the state of play of the fulfilment of the TEN-T target for the Core Network lines in relation to the train length requirement (740 m by 2030) and propose priority interventions with the best value for money approach based on the traffic flows indicated in the Transport Market Study (TMS) of Mediterranean RFC in 2014.

The aim is thus to apprise the state of play of the train length parameter along the Mediterranean Rail Freight Corridor (RFC) as for the year of release (2018), and by two different timelines: by 2025 and by the target date according to the Reg. 1315/2013¹, which is 2030.

According to Regulation (EU) 1315/2013 on "Union guidelines for the development of the trans-European transport network", the trans-European transport network shall be achieved by a dual-layer structure, made of a comprehensive network and a core network. The Core network covers those parts of the European transport infrastructure which have been considered of the highest strategic importance for the construction of the trans-European network.

According to art. 39 of the Regulation, the infrastructure of the Core network shall meet all the first layer's requirements set out in Chapter II of the Regulation other than the following requirements:

- (i) full electrification of the line tracks and, as far as necessary for electric train operations, sidings;
- (ii) freight lines of the core network as indicated in Annex I of the Regulation: at least 22,5 t axle load, 100 km/h line speed and the possibility of running trains with a length of 740 m;
- (iii) full deployment of ERTMS;
- (iv) nominal track gauge for new railway lines: 1 435 mm except in cases where the new line is an extension on a network the track gauge of which is different and detached from the main rail lines in the Union.

For the scope of the present report only the requirement relating to the possibility to run trains with a length of 740 m was investigated; in any case this is not a stand-alone requirement, but it could also depend on the improvement of other parameters, such as for example those related to train weight.

It is worth pointing out that there is a difference between the length of a train and the length that the same train requires in terms of infrastructure. This means that train length does not equal the track length. In general, the length of a train consists of the overall length of a train made of all wagons and locomotives. On the infrastructural point of view, extra distances must be taken into account for many

¹Regulation (EU) No 1315/2013 of the European Parliament and of the Council of the 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU.

reasons (view of signals, stopping tolerance, speed). This general requirement is true for all the IMs composing the Mediterranean RFC, what can differ is the extra distance required.

For the scope of the study we consider that a train length of 740 m, which is the one foreseen for the lines of the Core network, is consistent with saying that on the infrastructural point of view usable track length for freight trains shall be at least 750 m.

Hence, the length mentioned in the report can be either 740 m or 750 m, in one case referring to the train length (locomotives + wagons) and in the other case referring to usable track length for freight (infrastructural) as explained in the above paragraph. If the max. train length on the main line is defined by the length of the tracks at stations and sidings along the line, also the track length of handover points and terminals is of crucial importance for freight trains' traffic. This is another aspect that defines the maximum train length, because at the end, all the elements composing the transport chain must be consistent and the weakest part defines the maximum value for each Corridor's section.

It's also important to add the Last Mile study conducted in 2018² by the Mediterranean RFC showed that the sample terminals (intermodal terminals located on the Mediterranean RFC lines) analysed are mostly not prepared to handle 740 m long trains. The study considered both the transfer stations (if necessary) and the freight terminals connected to them, where loading/unloading is performed. In most of the cases the terminals are not prepared to handle 740 m trains and in case of transfer stations/shunting yards this is true in particular for Italy, Slovenia and Croatia.

The first transport market study witnessed the interest of Railway Undertakings (RUs) and Terminal Managers (TMs) for interventions on the technological, industrial and infrastructural aspects. There was a high level of agreement on the need for infrastructural interventions aimed at increasing the length of trains that can run on the Mediterranean RFC³ and it was also considered of the highest importance to improve links/connections to ports.

Finally, in our study the Infrastructure Managers of the Members States are as follows:

- Spain – ADIF
- Spain/France – LFP
- France – SNCF Réseau
- Italy – RFI
- Slovenia – SZ-I
- Croatia – HZI
- Hungary – MAV

² Last Mile Study along the Mediterranean Rail Freight Corridor, 2018, not yet published.

³ Final Report of the TMS on RFC 6 pag. 39.

2. Analysis of the state of play concerning the fulfilment of the TEN-T targets for Core Network Corridors related to train length (750 m by 2030)

This chapter provides information on the present situation updated November 2018 in relation to the parameter train length (740m) and the plans of Mediterranean RFC members IMs.

2.1 Mediterranean RFC AS IS – November 2018



Figure 1: Max. train length – November 2018.

At a first glance of the map above, it is evident that the situation of the max. train length parameter along the Mediterranean RFC is still fragmented. The target value to have all the lines allowing trains of 740m is not yet a reality.

At the moment 740m long trains can run only on some sections of the MED RFC, in particular on the international section Barcelona Mollet to Figueres-Vilafant (Spain), on the international line Linea Figueres-Perpignan (Managed by LFP SA)**, on the overall French stretch of the Mediterranean RFC except for the small border section of the conventional line Cerbère-Portbou (FR-ES), which only allows 430 m long trains. On the eastern side of the Mediterranean RFC, the only part of the network adapted for 740 m long train is the one managed by MÁV Zrt, which allows 740 m long trains on the following

sections: Székesfehérvár – Budapest – Nyíregyháza – Tuzsér – Záhony (HU-UA border), Budapest – Miskolc – Nyíregyháza and section Győr – Budapest.

Max. length of trains along the Mediterranean RFC

➤ SPAIN

Generally, in Spain the Iberian gauge (1668 mm) is widespread and a UIC gauge (1435 mm) line was introduced on the border section between Barcelona and the French/Spanish border.

According to ADIF Network Statement 2019, the length of the railtrack at stations as well as other operating conditioning factors, are basic to determine the maximum length of trains that can circulate on the network⁴. Within the framework of the Plan to Promote and Stimulate Freight Transport by Rail, ADIF promotes management actions to enable and meet the demand for increased lengths of trains by RUs (Maps 3 and 3.1). At the moment, as far as the Mediterranean RFC is concerned, ADIF infrastructure allows for trains up to 750 m to run on routes in Barcelona - French Border. Should the vehicle length exceed the maximum allowed on a line or section - special length - it is necessary to request express authorization to the Capacity Management and Planning Department in the Traffic Management Directorate for Regular or Occasional trains and to the (H24) Traffic Department for immediate trains.

SPAIN YEAR 2018

max train length	km	%
740	178	5%
600	0	0%
$x \leq 575$	3,078	95%
tot km	3256	

Table 1: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Spain.

*The table do not consider the line under construction Almeria – Lorca and includes LFP infrastructure, 44 km of line between Figueres and Perpignan.

** As per the Network Statement page # 54 of LFP, the maximum total commercial length allowed is 850 metres (including traction locomotives) for freight trains. Trains with a length above 750 m, are authorized to operate if they are also authorized to operate in SNCF Réseau and ADIF networks.

⁴ Adif Network Statement 2019, p. 49. Available at:

http://adif.es/en_US/conoceradif/declaracion_de_la_red.shtml, see also annexed maps 2 and 2.3 and Map 3 and 3.1, with information on max. Train length on the different lines of the network.

➤ **FRANCE**

According to SNCF Réseau Network Statement 2019, in general the maximum length of freight trains is 750 metres, locomotives included, except for those worked at speeds greater than 140 km/h or on lines for which the operating documents specify a different length. On the French network trains longer than 750 m can run on specific routes identified in the technical information and may be subject to special arrangements.

FRANCE YEAR 2018

max. train length	Km	%
740	1,514	100%
x≤575	0	0%
tot km	1,514	-

Table 2: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in France.

➤ **ITALY**

In line with Rete Ferroviaria Italiana (RFI) Network statement⁵, the line module – representing the maximum length that can be used by the passenger and freight trains is given in the PIR Web. As far as the lines of the Mediterranean RFC are concerned, all the sections of the corridor need to be upgraded to allow trains of 740 m long. At the moment the max. value available on the Italian stretch of the corridor is 625 m.

ITALY YEAR 2018

max train length	km	%
740	0	0%
650	0	0%
625	263.46	34%
600	199	26%
x≤575	317	41%
tot km	779.46*	-

Table 3: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Italy.

*The table do not consider the connecting line (Torino-Tortona) inserted for dangerous goods which bypasses Torino P. Susa.

⁵ RFI Network Statement 2019, p. 86. Available at: http://www.rfi.it/cms-file/allegati/rfi_2014/PIR-2019-ENG.PDF

➤ SLOVENIA

According to Slovenske železnice d.o.o. Network Statement⁶, when constructing a train path, the Infrastructure Manager (IM) considers the usable lengths of station tracks and prescribes the maximum permitted length of the trains, which run on particular Public Railway Infrastructure (PRI) lines of the Republic of Slovenia. Maximum permitted length of a passenger train on the PRI is 430 m and of a freight train 700 m. On particular lines permitted length is extra restricted because of short station tracks.

By now, as far as the lines of the Mediterranean RFC are concerned, the max. train length available on the Slovenian lines is 650 m.

SLOVENIA YEAR 2018

max train length	km	%
740	0	0%
600	227	49%
x≤597	235	51%
tot Km	462	-

Table 4: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Slovenia.

➤ CROATIA

In line with HŽ Infrastruktura d.o.o. Network Statement 2019⁷, the maximum permitted length of a train operating on a line is determined on the basis of maximum permitted train length considering usable length of main tracks in individual stations on the relevant line.

The maximum permitted train length of train considering usable length of main tracks in a station is determined according to usable length of the main running track and its neighbouring longer main track. The permitted train length is determined for both main tracks (25 m for locomotive placement and spare 10 m are subtracted from usable lengths of the main running track and its neighbouring longer main track determined according to the Instruction for Determining Railway Line Capacity and Railway Station Capacity (HŽI-70),) and the smaller resulting amount is taken as the maximum permitted length of a train at a station. For stations which have special track capacities for reception of freight trains, with usable track lengths bigger than usable lengths of the main running track and its

⁶ SZI d.o.o. Network statement 2019 available at: https://www.slo-zeleznice.si/images/infrastruktura/Network_statement/2019/NS_2019_1.pdf

⁷ HŽ Infrastruktura d.o.o. Network Statement 2019, p. 29, available at: http://www.eng.hzinfra.hr/wp-content/uploads/2018/11/Ea2019_II_Procisceni-tekst.pdf

neighbouring longer main track, the maximum permitted train length is determined for trains for passenger transport and freight trains respectively.

CROATIA YEAR 2018

max train length	km	%
740	0	0%
600	13.404	4%
$x \leq 575$	362.00	96%
tot Km	375.41	

Table 5: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Croatia.

➤ HUNGARY

According to the Network Statement on terms and conditions of the use of the open access railway network of MÁV Zrt, the permissible train length is depending on the track length at stations (which is indicated in Annex 3.3.1.1. of the NS) and is determined by the shortest track of a station that can be found on the line.

As far as the lines of the Mediterranean RFC are concerned, half of them are open to train of 740 m without special permissions.

HUNGARY YEAR 2018

max train length	Km	%
740	806	59%
650	95	7%
600	458	34%
$x \leq 575$	4	0.3%
tot km	1,363	

Table 6: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Hungary.

OVERALL RFC MEDITERRANEAN STATE OF PLAY – November 2018

2018		
max train length	km	%
740	2496.00	32%
650	95.00	1%
625	263.46	3%
600	897.40	12%
x≤597	235.00	3%
x≤575	3763.00	49%
tot km	7749.86	-

Table 7: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC. The table considers the same lines accounted for the tables by IM.

According to the Third Workplan of the European Coordinator for the Mediterranean CNC⁸, published in April 2018, the compliance rate of this rail parameter, train length (740m) as a proportion of Mediterranean CNC rail network km was indicated as 23%.

According to the data collected for the purposes of this report, the compliance rate for the Mediterranean RFC is equal to **32%** updated November 2018.

The difference is partially due to the fact that the lines of the CNC are not exactly the same as the Mediterranean RFC network lines, but also because the present study has a latest date of release.

⁸ Third Workplan of the European Coordinator for the Mediterranean CNC, April 2018 available at: https://ec.europa.eu/transport/sites/transport/files/workplan_med.pdf

2.2 SCENARIO by 2025



Figure 2: Max. train length – projection by 2025

According to the information collected by all the IMs composing the Mediterranean RFC, the table below lists the interventions foreseen for upgrading the lines to a higher train length and meet the Ten-t target (740m long train) along the Mediterranean RFC lines by 2025. The analysis doesn't consider the connecting line introduced for dangerous goods between Torino -Tortona.

COUNTRY	SECTION	Works foreseen by
ES	Algeciras – Bobadilla	2023
ES	Almería – Murcia	2023
ES	Escombreras – Murcia	2023
ES	La Encina – Valencia FSL	2023
ES	La Encina – Alicante	2023
ES	Alicante – El Regueron	2023
ES	Valencia – Castellón	2023
ES	Castellón – Bif. Calafat	2023
ES	Bif. Calafat – Tarragona	2023
ES	Tarragona – Barcelona	2023

ES	Barcelona Area (CASTELLBISBAL – MOLLET - BARCELONA CAN – RUBI)	2023
ES	Barcelona – Portbou/Cerbère (French Border)	2023
IT	ALL THE SECTIONS of the Mediterranean RFC are foreseen to be upgraded for the circulation of 740 m long trains	2025
SI	Zidani Most - Pragersko	2025
SI	Divača - Ljubljana	2030
SI	Pragersko - Hodoš	2030
HR	Karlovac - Zagreb RK	2025
HR	Dugo Selo - Koprivnica	2025
HR	Koprivnica - Botovo - St. Bor.	2025
HR	Moravice - Ogulin	2030
HR	Ogulin - Karlovac	2030
HR	Zagreb RK -Sesvete	2030
HR	Sesvete - Dugo Selo	2030
HR	St. Bor. Savski Marof (HR-SI) - Zagreb RK	2030
HU	Budapest Ferencváros – Soroksár út Kikötő	2025
HU	Budapest - Érd	2025
HU	Érd - Pusztaszabolcs	2025

Table 8: Mediterranean RFC sections interested by upgrading works allowing the circulation of 740m long trains.

OVERALL RFC MEDITERRANEAN STATE OF PLAY – 2025

2025		
max train length	km	%
740	4774.86	61%
650	95.00	1%
625	0.00	0%
600	418.00	5%
x≤597	376.00	5%
x≤575	2227.45	28%
tot km	7891.31	-

Table 9: length of freight and mixed lines divided by permitted train length on Mediterranean RFC lines.
The difference in the overall Km from 2018 data is due to the construction of the new line in Spain from Almería to Lorca (142 km of line).

According to the indicative investments foreseen by the six IMs composing the Mediterranean RFC, the length of freight and mixed traffic lines allowing the circulation of 740m long trains by 2025 will be equal to **61%** of Mediterranean RFC rail network km.

2.3 SCENARIO by 2030



Figure 3: Max. train length – projection by 2030

In this chapter we are presenting indicative projections by 2030 divided by IM and for the overall Mediterranean RFC.

SPAIN YEAR 2030

*The exact data is not yet available, in case of sections allowing 740m long trains between Tarragona-Madrid-Algeciras, due to internal negotiations. So, the decision is pending.

2030*		
max train length	km	%
740	1,418	42%
600	0	0%
x≤575	1,980.3	58%
tot km	3,398	-

Table 10: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Spain by 2030.

*The table do not consider the line under construction Almeria – Lorca and includes LFP infrastructure, 44 km of line between Figueres and Perpignan.

** As per the Network Statement page # 54 of LFP, the maximum total commercial length allowed is 850 metres (including traction locomotives) for freight trains. Trains with a length above 750 m, are authorized to operate if they are also authorized to operate in SNCF Réseau and ADIF networks.

It is of the utmost importance to note that Spain foresees to implement decisive investments for the introduction of the UIC standard gauge (1435 mm) on most of the line sections interested by the upgrading of max. train length up to 740m. In particular, the implementation of the standard gauge is foreseen for the following lines: Escombreras – Murcia, La Encina – Alicante – El Regueron and for the coastal line La Encina - Valencia FSL – Tarragona – Barcelona – Spanish/French border on the conventional line. This will be a very important step, solving the different gauge bottleneck between the two Countries and aligning Spain with the rest of the IMs part of the Mediterranean RFC.

FRANCE YEAR 2030

2030		
max. train length	Km	%
740	1514	100%
x≤575		
tot km	1514	-

Table 11: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in France by 2030.

ITALY YEAR 2030

2030		
max train length	km	%
740	779.46	100%
tot km	779.46*	-

Table 12: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Italy by 2030.

*The table do not consider the connecting line (Torino-Tortona) inserted for dangerous goods which bypasses Torino P. Susa.

SLOVENIA YEAR 2030

2030		
max train length	km	%
740	287	62%
600	13	3%
x≤597	162	35%
tot Km	462	-

Table 13: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Slovenia by 2030.

CROATIA BY 2030

BY 2030		
max train length	km	%
750	271.050	72%
600	0.000	4%
x≤575	104.36	28%
tot Km	375.41	-

Table 14: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Croatia by 2030.

HUNGARY BY 2030

2030		
max train length	km	%
740	863	63%
650	95	7%
600	405	30%
x≤575	0	
tot km	1,363	

Table 15: length of freight and mixed lines divided by permitted train length on the lines of Mediterranean RFC in Hungary by 2030.

MÁV Zrt highlighted that regarding the investment foreseen for the Székesfehérvár – Boba section, the plans and permissions for the necessary investments are available but have to be revised having regard to the elapsed of time and the completion date cannot be confirmed at the moment.

OVERALL RFC MEDITERRANEAN STATE OF PLAY – 2030

2030		
max train length	km	%
740	5129.65	65%
650	95.00	1%
625	0.00	0%
600	418.00	5%
x≤597	162.00	2%
x≤575	2086.66	26%
tot km	7891.31	-

Table 16: length of freight and mixed lines divided by permitted train length on Mediterranean RFC lines (projection by 2030).

The difference in the overall Km from 2018 is due to the construction of the new line in Spain from Almería to Lorca (142 km of line).

According to the investments foreseen by the six IMs composing the Mediterranean RFC, the length of freight and mixed lines allowing the circulation of 740m long trains by 2030 as a proportion of the Mediterranean RFC rail network will be equal to **65%**.

3. Identification of train length bottlenecks and priority interventions according to Transport Market Study and Corridor Customers' needs

Mediterranean RFC carried out its first Transport Market Study (TMS) in 2014. In 2016 it was updated due to the extension of Croatia. The next update is foreseeable in 2020.

The essential elements of TMS has been delivered to the RUs and all of the IMs' infrastructural issues are discussed at the TAG/RAG meetings twice a year and once a year the customers are asked to respond the User Satisfaction Survey/Satisfaction with Infrastructure. In our TMS Report Chapter 1.2 Transport Demand, rail and road freights traffic gave us an overview together with an analysis based on Origin/Destination matrixes of NUTS2 zones. The volumes of goods between zones provides an excellent indication of flows and directions, routes.

The existing train length bottlenecks as shown in TMS Chapter 1 means the development areas and in the meanwhile the traffic flows gave us reliable inputs to set up the priorities for further interventions. For a better understanding rail freight traffic flows are showing us the existing traffic and road freight traffic flows are presenting the choices for shifting goods from road to rail, if the rail infrastructure will be further improved.

3.1 Rail Freight Traffic

	A	B	C	D	E	ES	FR	IT	SI	HU	Ext	Tot
A	9.295					484						9.779
B		129.505	21.699	567	16	186	2.479	4.740	40	330	12	159.574
C		7.113	422.036	9.277	1.188	775	2.164	18.313	3.597	3.046	1.190	468.699
D		424	21.380	275.161	2.245	15	397	1.045	1.700	2.146	7.160	311.673
E		42	463	409	66.300	1	11	1.502	235	2.500	377	71.840
ES	917	105	639	5	1	14.439	147	112		3	1.055	17.423
FR		3.799	3.928	258	51	696	66.103	2.240	20	11		77.106
IT		3.030	11.492	218	111	65	734	23.473	46	245		39.414
SI			5.577	1.407	158		14	130	3.520	966	80	11.852
HU		327	4.437	992	1.899	3	6	1.471	1.130	10.374	954	21.593
Ext		79	1.555	51.389	106	2.456			19	2.983	21.136	79.723
Tot	10.212	144.424	493.206	339.683	72.075	19.120	72.055	53.026	10.307	22.604	31.964	1.268.676

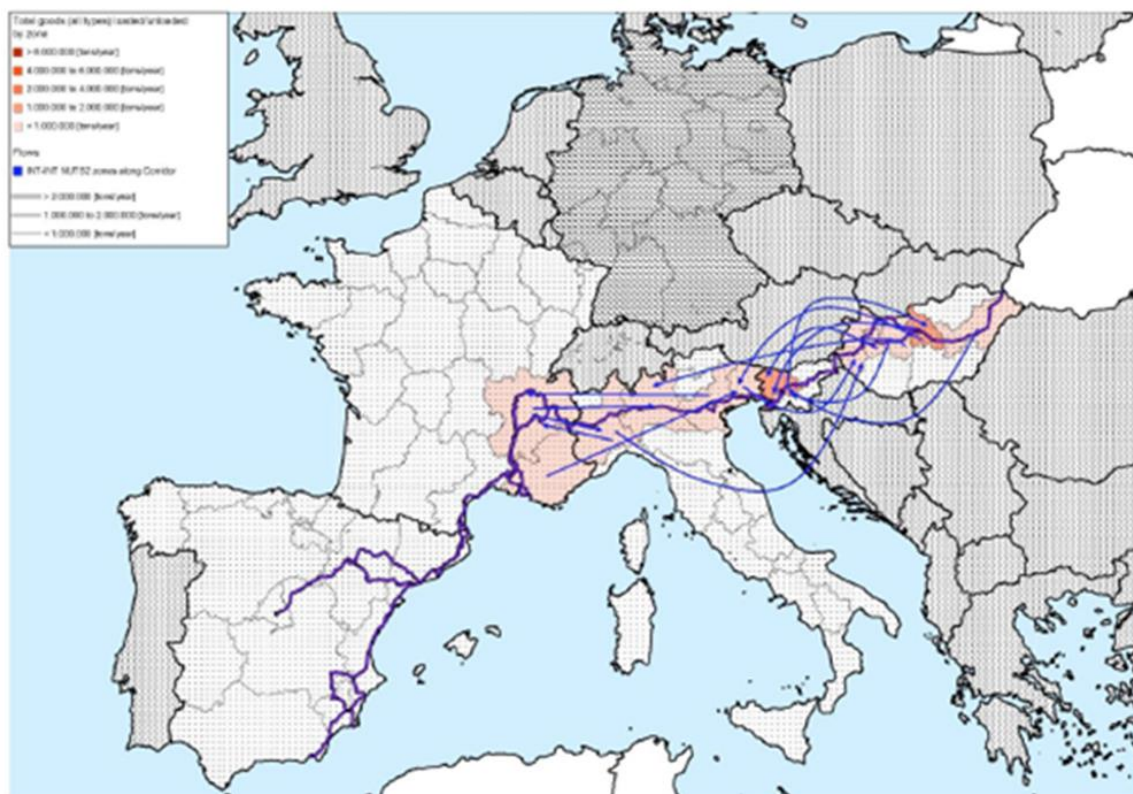
Source: Etisplus official web site (Etis Project) – Harmonised Rail Freight by OD, 2010

Table 17: Freight railway O/D matrix (thousands of tons, 2010), RFC6 Transport Market Study – Final Report Feb. 2014.

In the above matrix the rail freight traffic flows are between:

- France and Italy direction to/from is the most used part on the Western stretch of Mediterranean RFC, and the highest on our RFC
- Slovenia and Hungary direction to/from, it is the most used part on the Eastern stretch of Mediterranean RFC
- A substantial flow of goods to/from Italy and Hungary via Slovenia exists.

A detailed picture shows the flows as per NUTS2 zones, where the highest volumes of exchange of good are visible on the Eastern side of our RFC, even if exchanges to/from France are relevant.



Source: elaborations on Etisplus "Harmonized" rail O/D

Figure 4: Main international rail freight flows within NUTS 2 zones of Corridor 6, RFC6 Transport Market Study – Final Report Feb. 2014.

Cod Ori	Name Ori	Cod Des	Name Des	Tons/Year
SI02	Zahodna Slovenija	HU10	Közép-Magyarország	742.323
HU10	Közép-Magyarország	SI02	Zahodna Slovenija	694.949
HU22	Nyugat-Dunántúl	ITD4	Friuli-Venezia Giulia	386.673
FR71	Rhône-Alpes	ITC1	Piemonte	266.768
ITC1	Piemonte	FR71	Rhône-Alpes	199.069
FR71	Rhône-Alpes	ITC4	Lombardia	183.481
ITC4	Lombardia	HU21	Közép-Dunántúl	165.548
HU10	Közép-Magyarország	ITD4	Friuli-Venezia Giulia	134.494
HU32	Észak-Alföld	SI02	Zahodna Slovenija	131.177
HU21	Közép-Dunántúl	SI02	Zahodna Slovenija	120.593
HU21	Közép-Dunántúl	ITD4	Friuli-Venezia Giulia	111.667
FR82	Provence-Alpes-Côte d'Azur	ITD3	Veneto	111.548
ITC4	Lombardia	FR71	Rhône-Alpes	102.753
HU21	Közép-Dunántúl	ITC4	Lombardia	101.996
FR82	Provence-Alpes-Côte d'Azur	ITC4	Lombardia	92.985
SI02	Zahodna Slovenija	HU21	Közép-Dunántúl	83.117
SI02	Zahodna Slovenija	HU32	Észak-Alföld	82.626
FR82	Provence-Alpes-Côte d'Azur	ES51	Cataluña	79.985
SI01	Vzhodna Slovenija	ITD4	Friuli-Venezia Giulia	52.994
FR82	Provence-Alpes-Côte d'Azur	ITC1	Piemonte	52.649
Total International ROAD freight flows within NUTS2 zones of Corridor 6				4.764.052

Source: elaborations on Etisplus "Harmonized" rail O/D matrix

Table 18: Main international rail freight flows within NUTS2 zones of Corridor 6, RFC6 Transport Market Study – Final Report Feb. 2014.

3.2 Road Freight Traffic

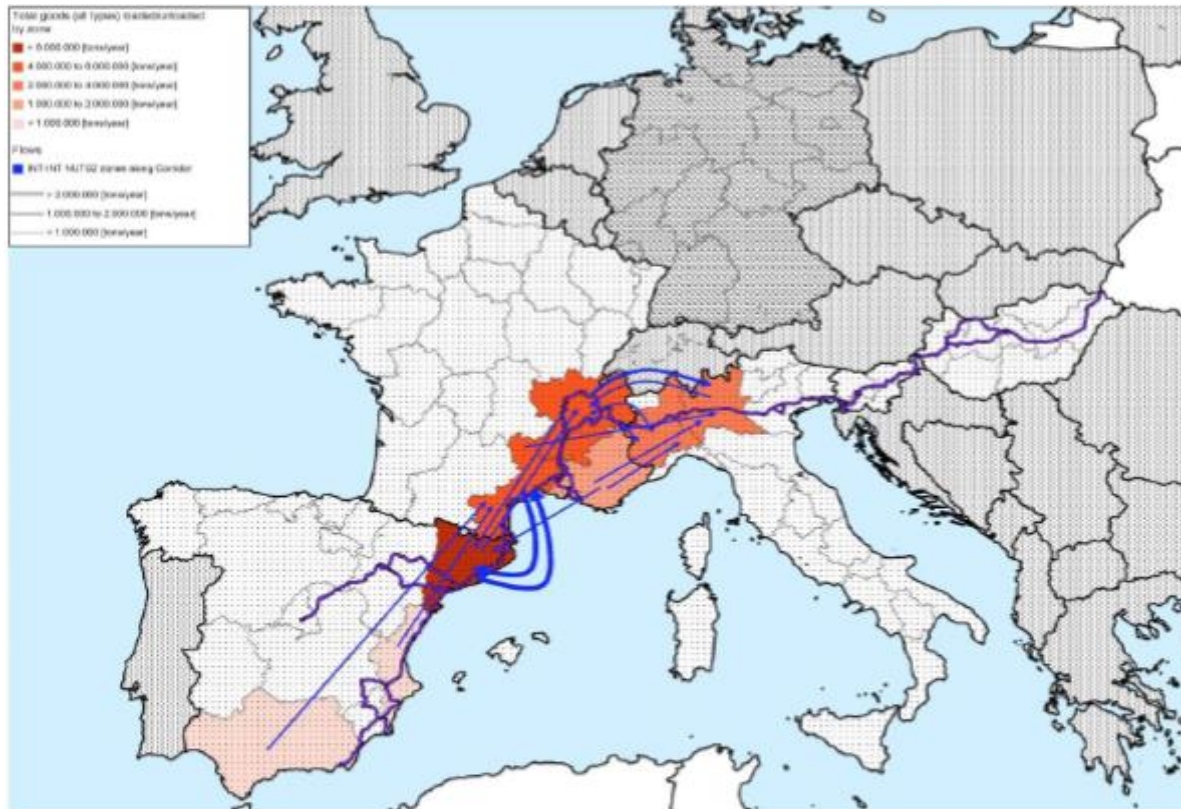
As shown in the below matrix, the highest road freight traffic flows are between Spain and France direction to/from, which is the most used part on the West and the highest as a potential for traffic shifting, together with France and Italy direction to/from.

	A	B	C	D	E	ES	FR	IT	SI	HU	Ext	Tot
A	201.277	628	1.069	158	56	8.869	1.904	521	22	20	23	214.547
B	761	2.405.679	68.602	9.845	1.072	4.821	47.810	4.649	297	889	524	2.544.949
C	1.061	73.520	4.371.560	45.941	3.692	6.027	29.016	22.914	2.731	5.032	2.078	4.563.572
D	179	8.593	51.213	1.599.204	1.937	1.312	4.719	5.550	800	5.583	7.423	1.686.513
E	37	876	3.598	997	1.013.847	232	790	3.144	1.628	2.045	594	1.027.788
ES	10.462	5.634	7.837	2.599	451	1.457.590	19.414	3.785	144	276	1.063	1.509.255
FR	1.821	36.353	27.166	4.214	677	18.542	1.965.921	11.607	364	312	338	2.067.315
IT	552	4.112	23.727	5.247	2.825	3.609	11.631	1.461.734	2.508	1.080	297	1.517.322
SI	1	346	2.933	864	1.420	94	386	3.203	59.985	682	76	69.990
HU	22	617	5.133	4.796	2.476	205	362	1.979	797	179.541	208	196.136
Ext	6	50	693	1.263	427	533	358	50	0	112	46.983	50.475
Tot	216.179	2.536.408	4.563.531	1.675.128	1.028.880	1.501.834	2.082.311	1.519.136	69.276	195.572	59.607	15.447.862

Source: elaborations on Etisplus "Harmonized" road O/D matrix and CAFT database

Table 19: Freight road O/D matrix (thousands of tons, 2010), RFC6 Transport Market Study – Final Report Feb. 2014.

A detailed picture (Figure 5) shows the flows as per NUTS2 zones. The most important areas concerned are located in 3 out of 5 countries: Spain, France and Italy. In particular, exchanges between Cataluña and Languedoc-Roussillon, plus those between Lombardia and Rhône-Alpes are the most important.



Source: elaborations on Etisplus "Harmonized" road O/D matrix and CAFT database

Figure 5: Main international road freight flows within NUTS2 zones of Corridor 6, RFC6 Transport Market Study – Final Report Feb. 2014.

Cod Ori	Name Ori	Cod Des	Name Des	Tons/Year
ES51	Cataluña	FR81	Languedoc-Roussillon	2.365.452
FR81	Languedoc-Roussillon	ES51	Cataluña	2.357.058
FR71	Rhône-Alpes	ITC4	Lombardia	1.019.191
ITC4	Lombardia	FR71	Rhône-Alpes	957.302
ITC1	Piemonte	FR71	Rhône-Alpes	783.109
ES51	Cataluña	FR71	Rhône-Alpes	755.148
ES52	Comunidad Valenciana	FR81	Languedoc-Roussillon	676.939
FR71	Rhône-Alpes	ITC1	Piemonte	644.632
FR82	Provence-Alpes-Côte d'Azur	ITC4	Lombardia	641.483
FR82	Provence-Alpes-Côte d'Azur	ITC1	Piemonte	605.841
FR71	Rhône-Alpes	ES51	Cataluña	597.119
FR82	Provence-Alpes-Côte d'Azur	ES51	Cataluña	589.094
ES61	Andalucía	FR81	Languedoc-Roussillon	554.860
ITC4	Lombardia	ES51	Cataluña	473.878
ES51	Cataluña	FR82	Provence-Alpes-Côte d'Azur	457.014
ES51	Cataluña	ITC4	Lombardia	445.086
SI02	Zahodna Slovenija	ITC4	Lombardia	415.321
SI01	Vzhodna Slovenija	ITC4	Lombardia	378.848
ITC1	Piemonte	FR82	Provence-Alpes-Côte d'Azur	364.678
SI02	Zahodna Slovenija	ITD3	Veneto	350.427
Total International ROAD freight flows within NUTS2 zones of Corridor 6				27.194.323

Source: elaborations on Etisplus "Harmonized" road O/D matrix and CAFT database

Table 20: Main international road freight flows within NUTS2 zones of Corridor 6, RFC6 Transport Market Study – Final Report Feb. 2014.

3.3 Conclusions

When setting up priority for investments, cost/benefit considerations are requested to take into account. Therefore, based on the existing and potential traffic flows, it is obvious that the priority interventions should be:

1. in Italy on the network of RFI, especially on the route from Milano, Novara, Torino and Modane, as this section is relatively short, with the existing massive traffic volumes and together with a huge potential for shifting goods from road to rail. Additionally, the connecting SNCF Réseau and LFP networks are well-equipped.
2. in Hungary and Slovenia to create a seamless 740 m train length, at least from Budapest to Koper. On this Eastern side, both networks require completion of the technical parameters on the one side, however on the other side the existing traffic volume is high enough and the growth potential is given.