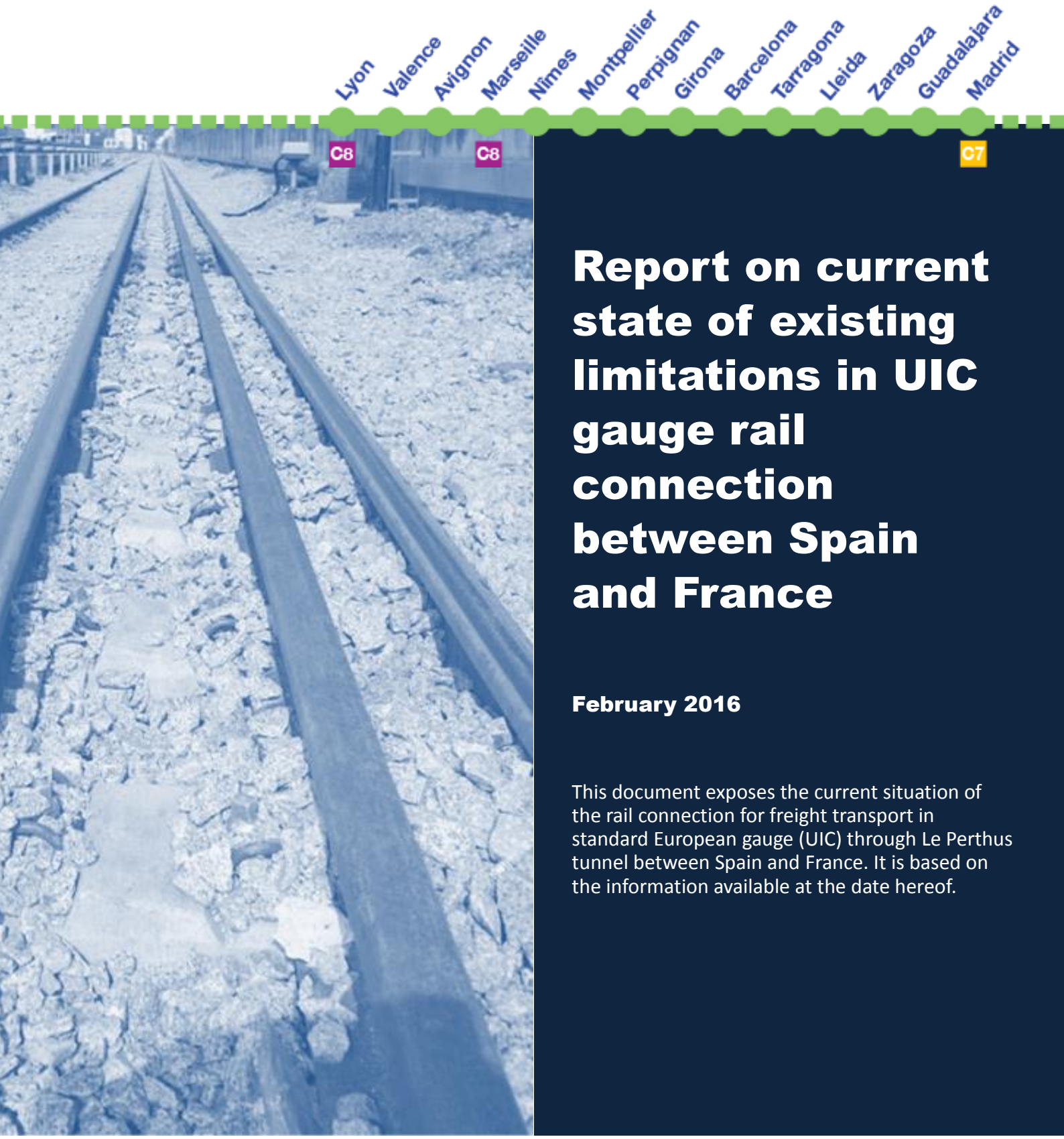

Report on current state of existing limitations in UIC gauge rail connection between Spain and France

February 2016

This document exposes the current situation of the rail connection for freight transport in standard European gauge (UIC) through Le Perthus tunnel between Spain and France. It is based on the information available at the date hereof.

CLYMA
THE GREEN LINE

DEVELOPMENT OF THE
CONNECTION
LYON-MADRID
ON THE MEDITERRANEAN
CORRIDOR

The TEN-T financial aid to CLYMA project finished in December 2015 so **this report is not included in the TEN-T Action** financed by the European Commission. However, the content of this document is based mainly in the information generated during the Action.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Current situation of the UIC connection

Since December 2010 the new UIC gauge line through Le Perthus tunnel connecting France and Spain is operational. The first service for passengers between Barcelona and Paris, with transfer at Figueres-Vilafant, was launched on 19th December 2010, whilst the first freight train used this line on 21st December 2010.

After 5 years in operation rail traffic on this new line is very limited and quite lower than expected. Currently, with regard to passenger traffic, the offer is limited to the following services:

- Barcelona – Paris (2 daily trains on each direction, 4 trains are announced for the summer period).

- Barcelona – Lyon (1 daily train on each direction).

- Madrid - Barcelona – Marsella (1 daily train on each direction).

The direct connection between Barcelona and Toulouse, one of the first passenger services using the line, has recently been cancelled and now it is necessary to change train in Narbonne in order to go to Toulouse.

Although passenger traffic is below the expectations, the situation is not as dramatic as it is for freight. Currently, only four regular services use the line:

- Barcelona Morrot – Antwerp (6 weekly trains on each direction, managed by Hupac).

- Barcelona Morrot – Busto (2 weekly trains on each direction, managed by Hupac).

- Barcelona Morrot – Ludwigshafen (3 weekly trains on each direction, managed by Kombiverkehr).

- Port de Barcelona – Marckolsheim (2 weekly trains on each direction to transport new cars, managed by Gefco. In fact these 2 trains form Le Perthus to Marckolsheim become 4 trains on the Spanish side of the border, form Le Perthus to Barcelona, due to the 500 m length limitation on the UIC line in Spain).

The operators that use the old Port Bou line have not changed their traffic to UIC gauge and still tranship the cargo or change axis at the border. In fact, about 30 weekly services for freight cross the Spanish-French border in Port Bou in each direction.

Several services that tested the new line have been cancelled. Moreover, new services currently being designed consider again old connection via Port Bou more viable in terms of cost and feasibility than the UIC line.

These facts have been confirmed by the results from other studies such as I-FreightMed project ones and several rail operators' opinions.

It is necessary to highlight that the new rail connection is a unique case in the world of a line being used simultaneously by high-speed passenger trains and freight trains. The mixed character of the line limits substantially its use for freight due to the priority given to passenger trains and the important security and operational limitations required for high-speed lines. This implies as well limited availability of commercially suitable slots for freight services.

It is important to mention that the low number of trains has reduced significantly the Le Perthus tunnel concessionaire revenues. In March 2015 the concessioner submitted a bankruptcy notification with a debt of over 400 million euros, according to press information. In mid-July the bankruptcy process has been opened in the judicial administration of Girona. These financial difficulties add doubts among rail operators about the future and viability of the connection.

Traction offer problems

Besides the line's structural limitations for freight transportation, additional limitations have been identified during these five years. The main current bottleneck is the lack of competitive and liberalised traction offer. Indeed, between Barcelona and Le Soler nowadays there are only 3 tandems of locomotives available. These locomotives, which were originally designed for passengers, were specifically adapted for freight transport in this section (tandems of 2 locomotives are needed instead of a single locomotive due to infrastructure and operational limitations of the line: triple tension and signalling, high gradient, etc. that will be further detailed in this document).

The lack of traction offer is due to the following reasons:

- There is no competition of UIC traction on Spain. The few existing locomotives belong only to Renfe.

- These locomotives are not available for rent to other operators (not assigned to Rosco). Therefore, they are not accessible to third parties.

- The lack of traction equipment could be balanced with the opening of a rent market in Europe or the adaptation of existing materials to the required technical and market conditions. However, the approval and homologation processes for circulation are too complex and expensive, becoming a huge barrier to the entrance of new rail operators. The unusual operational features of this section make the material adaptations expensive and only useful for this Mediterranean Corridor section and not for the rest of the network.

- The features required for locomotives are not clear. Some rail operators, interested in developing new traction services have not managed yet to clearly identify which are the technical and operational requirements for locomotives requested by the rail

infrastructure manager. Without this information it is impossible the acquisition or adaption of suitable locos.

- The difficulties in the homologation and the high cost of new equipment prevent private operators to access specific traction equipment for such a limited train route (less than 200 km).

- The lack of a credible calendar of works across the Mediterranean Corridor and the poor definition of the functional specifications of the rail line to be constructed prevent private operators to make investments for fear of not being suitable to future requirements in the whole Corridor. This fact affects both rolling stock investments and terminal adaptation.

High UIC costs

Traction offer prices related to the UIC line in Spain range between 22 and 35 €/km. This doubles the average traction costs on the Iberian gauge network, mainly due to the lack of competition, but also due to other factors such as:

- Production costs in UIC are very high, possibly due to allocation criteria and amortization of rolling stock adaption to UIC, three voltages and 3 safety systems costs.

- Currently, the trains in Spain and France cannot run from origin to destination with the same composition and they have to change locomotive and driver in Le Soler. This increases substantially the costs of the services.

- The concession toll of Le Perthus increases rail services cost and reduces its competitiveness and its logistic supply attractiveness. At this moment, for intermodal and car services this toll is more than 800€/train. This often accounts for a 15% increase in the traction cost from Barcelona to the border.

- In France, the traction costs are very high (double than in Spain) and also the shunting costs are high between Le Soler and Perpignan.

Slots availability

A third aspect which limits substantially the line's attractiveness for freight trains is the lack of available commercially attractive train slots. Although it is true that theoretically the line has a high available capacity due to its low utilization, the truth is that it is difficult to obtain appropriate slots adapted to the demand requests. Partly due to the non-availability of traction (see previous problem) in the requested periods, but also for additional reasons such as:

- Non operability of the line due to maintenance works in the tunnel. For this reason currently it is not possible to cross Le Perthus tunnel during a wide range of hours at night. And often, these are highly demanded slots for freight.

- The high rail congestion in the French section, especially in the Narbonne-Nimes section, makes it difficult to extend services northwards, especially with commercially attractive slots. Heavy regional traffic hinders slot coordination for long-distance freight itineraries (particularly international traffic) and the continuity of the services in both sides of the border is very complex.

- There are different priority criteria for slots allocation in both countries. In Spain, passenger services have priority over cargo services. However in France, services planned in advance (passenger or freight) have priority. Commercially demanded slots for international freight traffic are quite difficult to coordinate.

- Private operators demand more transparency from the rail infrastructure managers in slot management and allocation. Advantages granted to public operators are claimed and rail undertakers question the guarantee of a fair access to the network. This problem is more relevant in France where SNCF and SNCF Réseau are grouped in the same holding.

- The standard procedures to obtain rail slots (booked almost on year in advance) are sometimes inefficient and rigid. In France it is easy to obtain last-minute slots without previous planning. However, they are not appropriate for long-distance trains.

- Currently, passenger trains have reduced their speed on the line due to the compatibility problems with freight transport because the crossing of HS and freight trains has some security issues. In a near future and if passenger trains speed is increased, further limitations for freight trains may appear in the Mollet – Vilobí d'Onyar (Girona) section, reducing slot availability.

Infrastructural and interoperability problems

Likewise, infrastructural and interoperability problems persist along the connection between Spain and France, problems which limit the future use of the line:

- Three different electrification standards on the railway network (1.500 V in France, 3.000 and 25.000 in Spain) that requires multisystem locomotives (for the tree electrifications).

- The existence of three different signalling and controlling systems that increase the cost of freight trains. The high speed line uses the ERTMS system whereas conventional freight uses the ASFA system (in Spain) and the KVB (in France). Therefore it is necessary to adapt the system of the high speed line to the freight systems ASFA/KVB or include the ERTMS system to the current locomotives.

- The slope of 18 0/00 of Le Perthus tunnel and the new Girona tunnel endangers the maximum cargo of freight trains, so that very heavy trains require two locomotives and reinforced traction hooks in the wagons.

- Circulation difficulties exist with the third rail (Barcelona-Mollet) due mainly to the track changes.

- One of the advantages the new UIC line was supposed to have for freight trains - the circulation of large trains - has disappeared. In December 2013, ADIF informed that due to safety regulations the trains that run on the UIC track cannot overpass 500 metres. In the continuation of the Madrid along Zaragoza line, there is the same problem of limitation of train length. Apparently, this limitation should be solved in short term, but currently it still remains. This is a huge limitation, as rail operators consider the train length one of the critical aspects for a feasible service.

- One operator has stated that, although the 22,5 tonnes per axis are allowed alongside the line, heavy trains can have problems to assure the allowed braking distance. This is a result of the high slopes on the line because although it is possible to load some heavy wagons on a train without problems, if all the train weights 22,5 tonnes per axis it could be necessary to add additional empty wagons to the train to have enough axis to stop the train in the required distances. To force the existence of empty wagons on a train mean extra costs for operators. In that way, heavy trains like chemical ones may have difficulties on the line.

- Curves alongside the line are designed for HS trains, with a camber adapted to trains with speeds of 300 km/h. A minimum speed could be required in order to avoid damages in the lower rail of the camber when heavy train circulate on the line. The requirement of a minimum speed combined with the existing slope may be an additional limitation to develop new services for long and heavy trains.

Crosbordering rail motorways

VIIA is one of the operators that intend to operate services from Spain to France and Germany using the UIC line through the Perthus tunnel. The Lorh wagons currently used by VIIA's rail motorways must be tested on the UIC Spanish line prior to the development of these services.

Two tests with rail motorway trains have been performed. The first was performed along the cross-border stretch of the line through the Perthus tunnel. In May 2013 an 844-metre long, 2,274-tonne rail motorway train passed successfully through the Perthus tunnel. During the test, VIIA also checked the capacity of the train to start its engines on an 18 0/00 slope.

In November 2015 a train loaded with six trailers equipped with sensors ran successfully from Perpignan to Barcelona Can Tunis. The Lohr UIC wagons are suitable for existing railway infrastructures and standard road equipment.

Both test show that this kind of trains can be technically used alongside the UIC connection between Barcelona and the French border.

Conclusions

The new UIC gauge rail line through Le Perthus tunnel connecting France and Spain has not solved the interoperability problems between both countries for freight cargo. Three different types of electrification (1,5 kV, 3 kV and 25 kV) and three different signalling systems (kVB, ASFA and ERTMS) plus additional infrastructure constraints coexist on the cross-border section.

In the Spanish side infrastructure limits the train length to 500 m maximum and UIC gauge connects only few rail terminal around Barcelona. On the French side there are no significant limitations related to infrastructure (850m-long trains are allowed) but some sections face serious capacity constraints, mainly the Narbonne-Nimes section where few additional trains will saturate the line.

However, the main problem at this moment is the lack of a competitive traction supply. Between Barcelona and Le Soler only three tandems of locomotives are currently available, all of them belonging to RENFE and not available for other operators (not assigned to ROSCO). That means that there is no competition on UIC traction. The high cost required to adapt additional locomotives to the special technical requirements of this section (due to the infrastructure and interoperability problems) and complexity of the homologation and approval processes prevent new operators to acquire new rolling stock.

Even though all studies highlight the existence of an important demand for the line (10.000 trucks cross the border on a daily basis), if the identified problems are not solved, reducing costs and making the connection competitive, rail operators will not consider opening new routes using the connection through Le Perthus. We should never forget that the line suffers a design structural limitation that will not be solved unless high-speed passenger trains are separated from freight trains.

The benchmarking analysis made in CLYMA project has confirmed that the co-existence of high-speed passengers and conventional freight traffics in this section of the Mediterranean Corridor identifies this one as the only line in the world with simultaneous mixed traffic. This is a limitation for potential freight traffic growth as priority given to passengers' traffics, operational requirements, costs, maintenance works taking place at night, etc, negatively impact the circulation of freight trains on the line. There are high-speed lines in Germany and France in which freight services are operated. However, in both cases these freight services are specialised in parcel, courier and press or run mainly on night-time; thus no massive freight transport, such as the expected in the Mediterranean Corridor, is operating on high-speed lines these days.

The information included in this report is based on CLYMA project outputs. The TEN-T financial aid to CLYMA project finished in December 2015 so **this report is not included in the TEN-T Action financed by the European Commission**. However, the content of this document is based mainly in the information generated during the Action.

CLYMA project consists of the implementation of the corridor approach to a section of the **Mediterranean corridor**, concretely to the Western part of the corridor and specifically to the Lyon-Madrid Axis.

The project comprises of studies and actions on the organization and optimal implementation of the **TEN-T network**, taking into account long term perspectives, environmental aspects and associated needs, as well as studies that promote environmental sustainability, resource efficiency and low-carbon transport within an integrated transport concept. This should stimulate the deployment of the **Green Corridor concept.** The project also intends to develop a **managerial structure** for the intermodal corridor.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

PROJECT OFFICE
clyma@clyma.eu
+34 932 986 070
www.clyma.eu