

D.T1.3.3

IDENTIFICATION OF BOTTLENECKS IN INFRASTRUCTURE AND SERVICE IN EMILIA- ROMAGNA REGION

Work paper

Version 2.0

09.2020

Summary

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1. INTRODUCTION

In order to gain a comprehensive overview of the current situation about the bottlenecks in the freight rail network of Emilia-Romagna region, it has been decided to carry out their identification through two approach (paragraph 2): the consultation of the bottlenecks and the strengthening actions foreseen by the Integrated Regional Transport Plan (PRIT 2025) of Emilia-Romagna region and a bottom-up approach through the involvement of the member of ERIC cluster (survey activity, see Pilot Action #5 Deliverable D.T2.2.3 and D.T2.2.4).

According to the methodology established by project partners, three forms about the detailed bottlenecks investigation have been drafted (paragraph 3). Each of these forms is based on a specific area of the region and contains the detail investigation of some of the bottlenecks identified in paragraph 2.

In accordance with the activities foreseen by REIF project, the overcome of one or more of bottlenecks identified in the paragraph 2 will be implemented in the regional transport modelling tool in order to assess the development measures and to estimate the benefits within the rail freight market and in the regional transport networks (Pilot Action #5).

2. IDENTIFICATION OF BOTTLENECKS

The following Figures contain a brief description of the bottlenecks and strengthening actions identified in PRIT2025 and collected by the annual survey activity carried out with ERIC members. As can be seen in the tables below, some of the bottleneck identified by ERIC cluster members have been identified in the PRIT document yet.

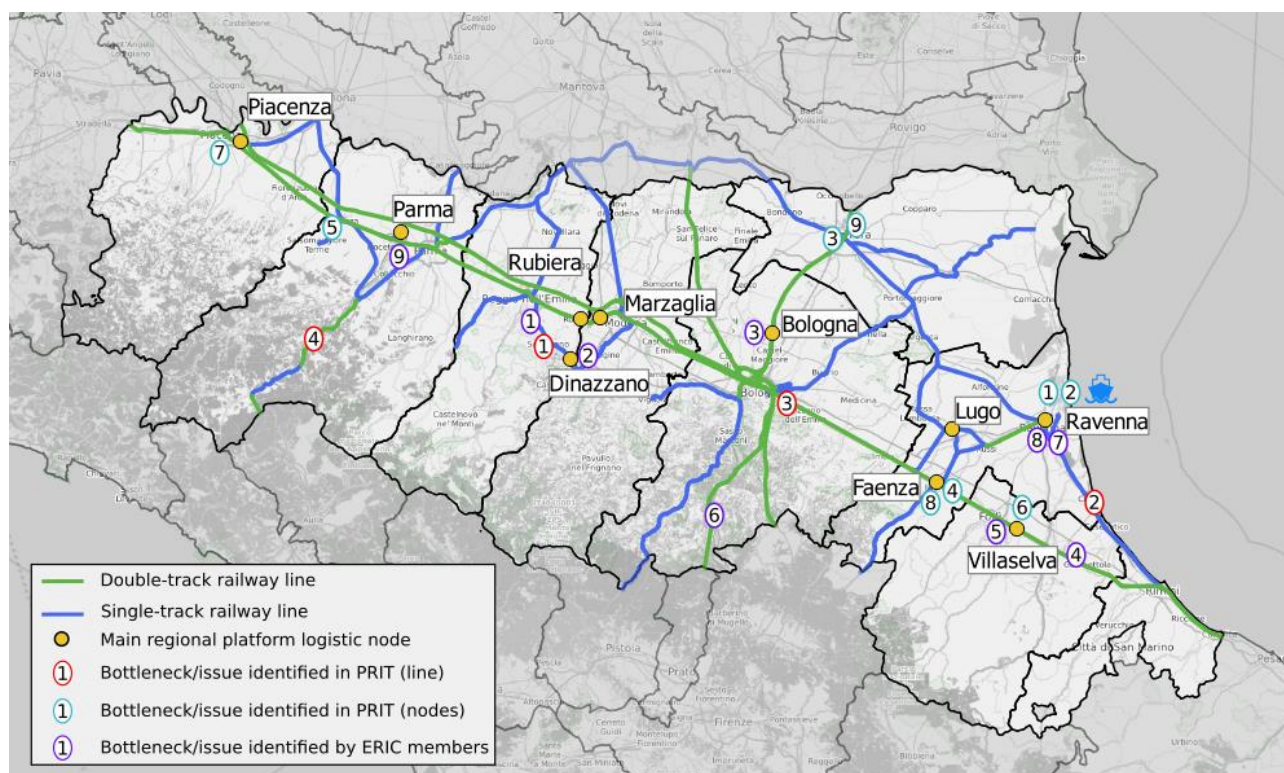


Figure 1 Bottlenecks and strengthening actions identified on freight rail transport. Source: ITL and RER elaboration

Table 1 - Bottlenecks and strengthening actions identified on freight rail transport lines. Source: PRIT2025

| id | Bottleneck/strengthening action identified in the PRIT 2025 (lines) |
|----|---|
| 1 | The single-track Reggio Emilia-Sassuolo line is the only link to Dinazzano terminal; and it is crowded during daytime due to the coexistence of freight and passenger traffic |
| 2 | A new North-South route is needed between Ferrara and Adriatic line, in order to reduce traffic on the Ravenna-Rimini line |
| 3 | High saturation level of Bologna bivio S.Vitale-Castel Bolognese section |
| 4 | Need for upgrade capacity improvement of Pontremolese railway line |

Table 2 - Bottlenecks and strengthening actions identified on freight rail transport nodes. Source: PRIT2025

| id | Bottleneck/strengthening action identified in the PRIT 2025 (nodes) |
|----|--|
| 1 | Ravenna port. Low capacity and high operation costs of the railway links between station and harbours. High terminal times and conflicts with heavy road traffic. |
| 2 | Ravenna port. Acceleration of manouvres between the railway station and the two links (Left/right) with the harbour. Use of Candiano freight yard. |
| 3 | Ferrara station. A direct connection on the route Ravenna-Ferrara-Poggio Rusco is needed. |
| 4 | Faenza station. A direct connection on the route Ferrara-Faenza-Rimini is needed. |
| 5 | Fidenza station. A direct connection on the route Fornovo-Fidenza-Bologna is needed. |
| 6 | Villa Selva terminal. Completion of works. |
| 7 | Piacenza terminal. Increase of rail traffic capacity. |
| 8 | Faenza freight yard. It is located into the urban area. |
| 9 | Ferrara station. The passenger station intercept freight traffic |

Table 3 - Bottlenecks identified by ERIC members. Source: ERIC annual survey (2020)

| id | Bottleneck identified by ERIC members |
|----|---|
| 1 | Dinazzano terminal. The performances of Reggio Emilia-Dinazzano railway line is low (it is not electrified and in the Scandiano station the train length allowed is not adequate) |
| 2 | Dinazzano terminal. The terminal is reaching saturation |
| 3 | Bologna freight village. Shortage of tracks dedicated to arrival/departure of trains |
| 4 | Lotras (Villa Selva) terminal. Allowed train length along the line leading to the terminal shorter than that allowed in the terminal (575 m vs 645 m) |
| 5 | Lotras (Villa Selva) terminal. Lack of electrification down to the operational tracks of the terminal |
| 6 | Rubiera terminal. Loading gauge along the Bologna-Firenze-Spezia not allowing for high cube containers. Along the same route there is limitations on weight and length of trains (No possibility to operate train with a length of 500 m and a weight of 1.600 t.) |
| 7 | Sapir terminal. Freight traffic must cross Ravenna passenger station. |
| 8 | Sapir terminal. The branch with national rail network is not electrified. |
| 9 | CEPIM. New tracks for locos and manoeuvres are needed. |

3. IDENTIFICATION OF INVESTIGATION AREAS

In order to deepen the knowledge of bottleneck in the freight rail network of Emilia-Romagna region, it has to decide to carry out the bottleneck analysis focused on three specific areas of the Region.

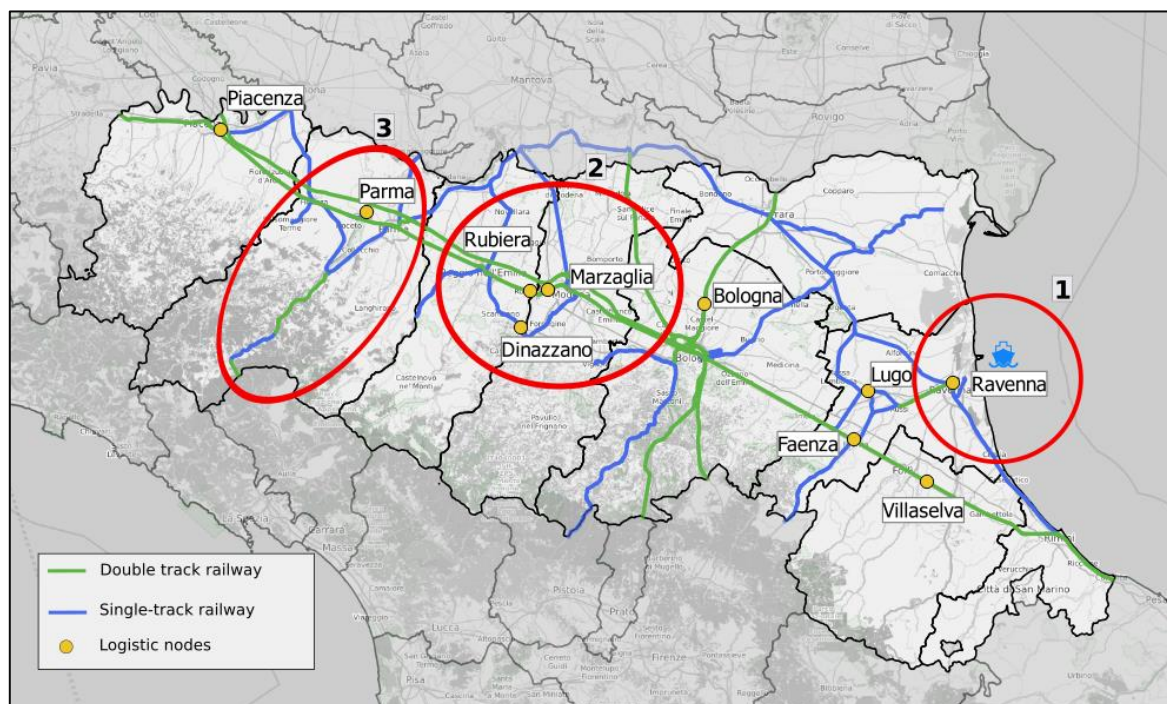


Figure 2 Identification of analysed area. Source: ITL and RER elaboration

Table 4 - Bottlenecks identified by area of investigation

| Area of investigation | Bottlenecks |
|--|---|
| 1) Port of Ravenna | Rail access to the port terminals: <ul style="list-style-type: none"> lack of capacity and traction system |
| 2) Tiles and Ceramics districts (province of Modena and Reggio Emilia) | Reggio Emilia - Sassuolo railway line: <ul style="list-style-type: none"> Missing links Low capacity of existing railway lines Speed restrictions, train length, missing links, lack of capacity Bologna-Prato railway line: <ul style="list-style-type: none"> Loading gauge |
| 3) West provinces of Emilia-Romagna region | Parma-La Spezia (<i>Pontremolese</i>) railway line: <ul style="list-style-type: none"> lack of capacity |

3.1. FORM FOR DETAILED BOTTLENECK INVESTIGATION

BOTTLENECK NO. 1

Rail access to the Ravenna port rail terminals

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

| | |
|------------------------------|---|
| transport infrastructure | X |
| rolling stock / machinery | |
| services / operations | |
| legislation / administration | |

PROBLEM DESCRIPTION

AREA: Ravenna port

In the current situation, each freight train coming from or to the Ravenna port left and right harbour has to stop at the Ravenna train station, whose level of utilisation is close to the capacity and the interference with passenger trains at the station represent a critical issue for terminal times.

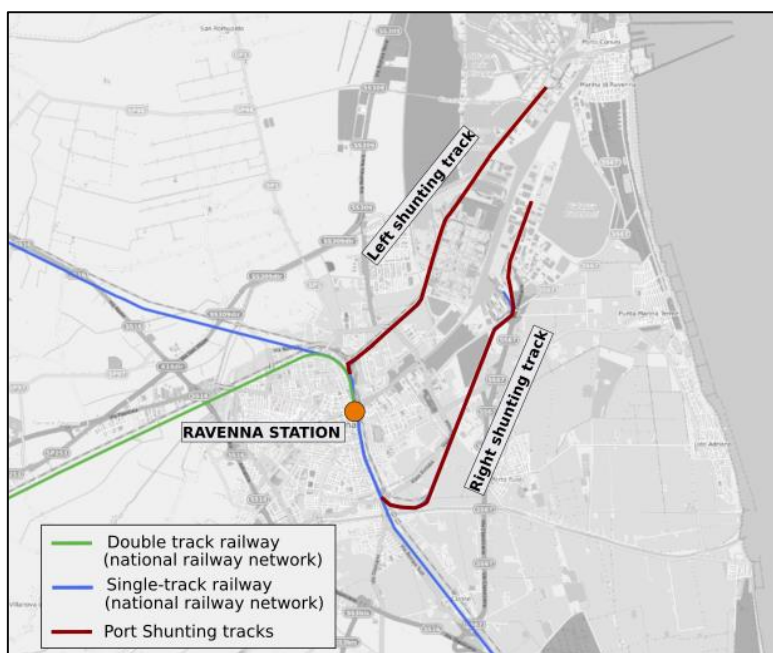


Figure 3 Overview of Ravenna node. Source: ITL and RER elaboration

Furthermore, links for the harbours are not electrified and this is a direct cause of the high operation costs. The are also bottlenecks due to the conflict with the road traffic and road infrastructures.

The bottlenecks identified in the railway nodes of Ravenna can be summarised as follow:

- Freight terminal close to its capacity limit;
- Interference with passenger train station;
- Low speed and long travel time to port terminals;

- Road - rail interference

One of the interferences between rail road infrastructure, that has represented a major weakness for the development of potential market of the Port of Ravenna, will be overcome. Indeed, the actual Teodorico overpass, that crosses the railway line at a distance less of 600 meters from the railway station, does not allow the P/C80 profiles. Demolition of the bridge has started in June 2020 and the rebuilding of the new one is expected to be concluded at the end of this year.

All the bottlenecks mentioned are included in the Integrated Regional Transport Plan (PRIT 2025) and actions to overcome them have been drawn. Thanks to a regional collaborative approach, that it is already mentioned as a Best Practise in the Deliverable D.T1.1.1, the Emilia-Romagna Region has set up a planning technical working table that includes institutional stakeholder.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

| | |
|--------|---|
| low | |
| medium | |
| high | X |

PROBLEM-SOLVING APPROACH

In the figure below, actions that have been described in the PRIT 2025 in order to overcome bottlenecks of Ravenna port's rail accessibility are shown.



Figure 4 Focus on Ravenna railway node.

1. Elimination of a level crossing (Via Canale Molinetto)
2. Extension of the shunting track to the new container terminal
3. Teodorico Bridge: Upgrading to P/C80
4. Strengthening of the left shunting track (the northern one) :
 - upgrade of the rail yard to freight terminal;
 - direct link to North bound main line into operation
5. Strengthening of the right shunting track (the southern one):
 - electrification and equipment of the track;

- realisation of new freight terminal

As mentioned before, the rebuilding of Teodorico bridge is expected to be concluded at the end of this year. The cost of the project is estimated to be 9 million euros.

Other improvements regard the extension of the shunting track to new terminal container (foreseen by the “Progetto Hub”) and the overcome of the level crossing (Via Canale Molinetto), which is expected to be completed the next year.

The most important actions are focused on the upgrading of the left and right shunting tracks (47,7 million euros). For the first one the electrification of the shunt and construction of the new tracks (7). For the right shunting track, it is foreseen the electrification and equipment of the track and the realisation of new freight terminal. Even some of these actions have been already started and the overcome of the bottlenecks described will allow the meet the increasing of modal split of railway in port traffic, expected in the next years.

Other intervention in the railway network upgrading regards the direct link between the national rail network to the shunting tracks, that allow freight trains to avoid Ravenna station. In particular the intervention between the left shunting track and the national railway network is in the feasibility phase.

RESPONSIBILITY

- RFI - National Rail infrastructure manager
- Local Municipality
- Ravenna Port Authority
- Emilia-Romagna Region

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

| | |
|-------------|-------------------------------------|
| Immediately | <input type="checkbox"/> |
| Short-term | <input checked="" type="checkbox"/> |
| Mid-term | <input checked="" type="checkbox"/> |
| Long-term | <input type="checkbox"/> |

EXPECTED BENEFIT

(Select the benefit with X)

| | |
|--------|-------------------------------------|
| Low | <input type="checkbox"/> |
| Medium | <input type="checkbox"/> |
| High | <input checked="" type="checkbox"/> |
| Vast | <input type="checkbox"/> |

AN EXAMPLE OF BEST PRACTICE



If you have any information's and if they are relevant, please add an example of best practice for elimination of the relevant bottleneck.

3.2. FORM FOR DETAILED BOTTLENECK INVESTIGATION

BOTTLENECK NO. 2

Low capacity of existing railway network direct to Ceramics and Tiles district

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

| | |
|------------------------------|---|
| transport infrastructure | X |
| rolling stock / machinery | |
| services / operations | |
| legislation / administration | |

PROBLEM DESCRIPTION

AREA: Ceramics and Tiles District (provinces of Reggio Emilia and Modena)

As mentioned in the deliverable D.T1.2.3. "Analysis of market potentials for rail freight transport in Emilia-Romagna Region", ceramic district is located mainly between the provinces of Modena and Reggio Emilia (municipalities of Sassuolo, Fiorano, Castellarano, Casalgrande, Castelvetro, Rubiera). It is one of the main clusters of the region and it is responsible for over 80% of the national production.

According to official data (source: Confindustria Ceramica), in 2017 exports to Europe (EU28) amounted to approximately 189 million sqm, for a value of 2.651 million euros. To the USA the figure is 53 million sqm and 872 million euros; to Asia 40.5 million sqm and 557 million euros.

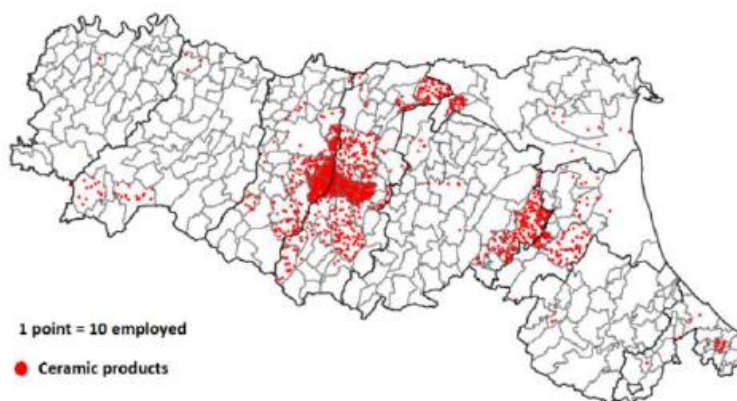


Figure 5 Companies of Ceramics product district Source: Art-ER ERVET

Three logistics node of Emilia-Romagna logistic platform (Dinazzano Scalo, Rubiera Terminal and Marzaglia) are located within the ceramic cluster and certain share of their rail offers is dedicated to the cluster import and export activities. Dinazzano Scalo is located along the Reggio Emilia-Sassuolo regional railway line managed by FER, Marzaglia is located along the national railway line Bologna-Milano and Rubiera is located along a branch joined to the same national railway line. In the table below the characteristic of these lines are shown.

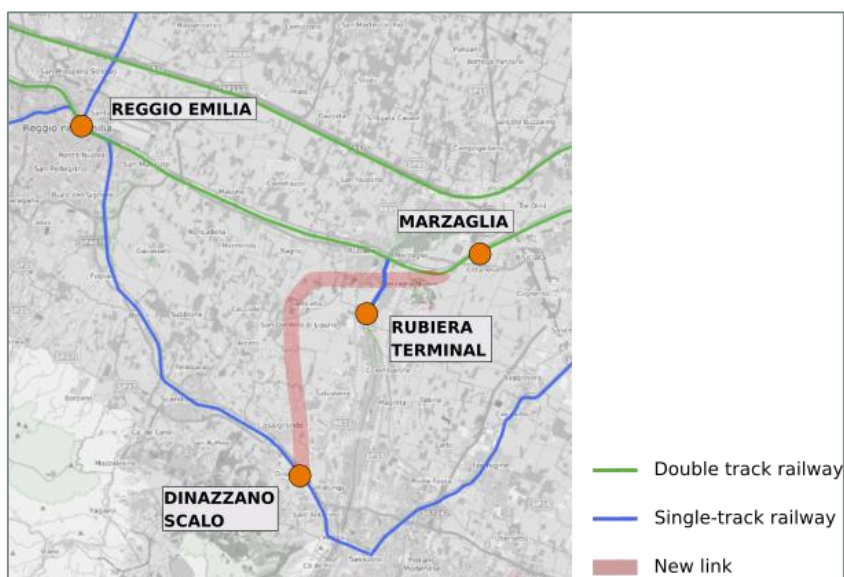


Figure 6 - Railway network analysed. Source: ITL and RER elaboration

| Node | Railway line | Number of tracks | Traction system | Axle load | Train length (m) | Loading gauge |
|------------------|-------------------------------|------------------|-----------------|---------------------|------------------|---------------|
| Dinazzano Scalo | Reggio Emilia-Sassuolo (FER) | 1 | Not-Electrified | C2 (20 tons/axle) | 500 | TES |
| Rubiera Terminal | Bologna-Milano - branch (RFI) | 1 | | D4 (22,5 tons/axle) | 400 | |
| Marzaglia | Bologna-Milano (RFI) | 2 | Electrified | D4 (22,5 tons/axle) | 625 | P/C45 |

Table 5 - Infrastructure characteristic of logistic node's railway line

The node of Dinazzano is mostly affected by the current railway line conditions:

- Single-track line,
- low train length (500 meters)
- mixed-use of railway line with passenger trains
- level of utilisation of line is closed to the line capacity, especially during daytime.

The bottlenecks identified along the Reggio Emilia-Sassuolo railway line are not the only ones that prevent the growth of modal share of railway of the ceramic and tiles district. Indeed, in order to reach the ports of Ligurian Sea from Ceramic district trains run the Bologna-Prato-Firenze-Pisa-La Spezia route. Freight trains is affected by a low performance of railway line in terms of loading gauge, that between Bologna and Prato, is classified as P/C22.

Due the maritime freight transport market condition, high-cube container is becoming the most widely intermodal transport unit. Given the incompatibility between high-cube container and P/C 22 loading gauge, it is necessary to upgrade railway line in order not to lose competitiveness with road transport.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

| | |
|--------|-------------------------------------|
| low | <input type="checkbox"/> |
| medium | <input type="checkbox"/> |
| high | <input checked="" type="checkbox"/> |

PROBLEM-SOLVING APPROACH

In order to increase the railway network capacity towards Dinazzano and towards the ports of Ligurian Sea from Ceramic district the main interventions to be implemented are:

- upgrading of capacity, speed and train length of railway line
- electrification of railway line
- construction of new railway link between Dinazzano and Marzaglia

In order to strength the Bologna-Prato railway line towards the ports of Ligurian Sea from Ceramic district the main intervention to be implemented is to upgrade the loading gauge of the line (from P/C 22 to P/C 80). The renovation works have been started and their completion is foreseen by the year 2021.

RESPONSIBILITY

(Reggio Emilia-Dinazzano railway line)

- Emilia-Romagna Region
- FER
- Local Municipality

(Bologna-Firenze railway line)

- RFI - National Rail infrastructure manager

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

| | |
|-------------|-------------------------------------|
| Immediately | <input type="checkbox"/> |
| Short-term | <input type="checkbox"/> |
| Mid-term | <input checked="" type="checkbox"/> |
| Long-term | <input checked="" type="checkbox"/> |

EXPECTED BENEFIT

(Select the benefit with X)

| | |
|--------|---|
| Low | |
| Medium | |
| High | X |
| Vast | |

AN EXAMPLE OF BEST PRACTICE

If you have any information's and if they are relevant, please add an example of best practice for elimination of the relevant bottleneck.

3.3. FORM FOR DETAILED BOTTLENECK INVESTIGATION

BOTTLENECK NO. 3

Lack of capacity on Parma-La Spezia railway line

BOTTLENECK ALLOCATION

(Select the type of bottleneck with X)

| | |
|------------------------------|---|
| transport infrastructure | X |
| rolling stock / machinery | |
| services / operations | |
| legislation / administration | |

PROBLEM DESCRIPTION

PONTREMOLESE RAILWAY LINE

Due to the well-established relationship between the ports of Ligurian Sea and manufacturing sector of Emilia-Romagna, the upgrading of Pontremolese railway line is a crucial action in order to improve the railway connection with the La Spezia port.

The railway line is managed by RFI; its main characteristics are shown in the table below.

Table 6 - Parma-La Spezia railway line's overview.

| Parma-La Spezia Railway line (Pontremolese) | |
|--|-----------------------|
| Total length | 112 km |
| Length of single-track line | 64 km |
| Traction system | Electrified (DC 3 kV) |
| Track gauge | 1.435 mm |
| Maximum grade | 25/1000 |
| Train length | 475 meters |
| Loading gauge | P/C 22 |
| TEN-T network | Comprehensive network |

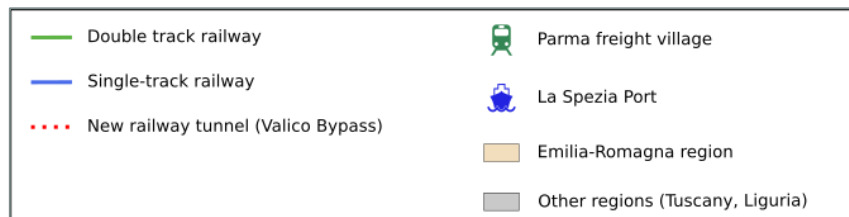
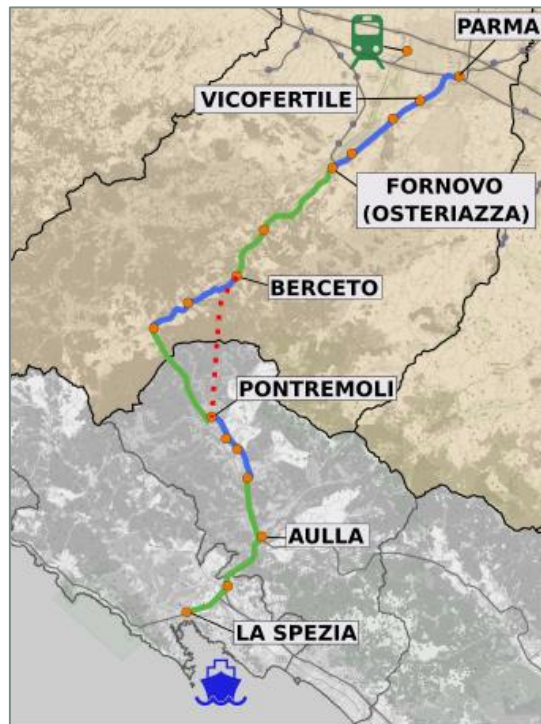


Figure 7 - Parma - La Spezia railway line. . Source: ITL and RER elaboration

The railway line is used both by passenger and freight trains. Along the railway line, as shown by Figure 7 ,there are three single-track railway line sections:

- Parma-Fornovo (Osteriazza) (Emilia-Romagna region)
- Berceto-Borgo Val di Taro (Emilia-Romagna region)
- Pontremoli - Chiesaccia (Villafranca) (Tuscany region).

These bottlenecks restrict the capacity of the line and also the actual railway routes between Berceto and Pontremoli represents, due to maximum grade of the line (25/1000), a critical limit to the development of market potential for rail freight transport of northern Italy area and, in particular, for manufacturing sector of Emilia-Romagna region.

Pontremolese railway line play also an important role in the rail freight transport European market. Indeed it is also comprised in the Tyrrhenian-Brenner rail corridor (Ti.Bre.), that links Tyrrhenian sea port with Central Europe regions.

BOTTLENECK CONSEQUENCES

(Select the level of consequences with X)

low

☐

medium

high

| |
|---|
| |
| X |

PROBLEM-SOLVING APPROACH

As regards to the single-track railway line between Parma and Osteriazza, funds have been allocated for the doubling of the line between Parma and Vicofertile. The funding was already foreseen by the 2020 RFI investment plan and it has received a considerable boost by the adoption of the so-called “Decreto Rilancio” decree, that have foreseen a number of measures in order to support Italian economy related to the current health emergency.

The completion of the overall project will be ensured by the forthcoming updates of RFI Planning agreement.

The strengthening of the Potremolese railway line is also one of the priority infrastructure projects included in the list that has been set out in the so-called “Italia Veloce” Investment Plan (Ministry of Infrastructures and Transport - MIT).

The realisation of the new tunnel is particularly complex by a technical and practical point of view (source: Osservatorio Territoriale Infrastrutture Nord-Ovest).

RESPONSIBILITY

- RFI - National Rail infrastructure manager

TIME FRAME

(Select the time, needed to eliminate bottleneck with X)

Immediately

Short-term

Mid-term

Long-term

| |
|---|
| |
| |
| |
| X |

EXPECTED BENEFIT

(Select the benefit with X)

Low

Medium

High

Vast

| |
|---|
| |
| |
| |
| X |



AN EXAMPLE OF BEST PRACTICE

If you have any information's and if they are relevant, please add an example of best practice for elimination of the relevant bottleneck.