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Introduction

The User Manual contains all essential information for the user to make full use of the RNE TCR webtool 2.0 system. This manual includes a description of the system functions and capabilities, contingencies and alternate modes of operation, and step-by-step procedures for system access and use. Use graphics where possible in this manual.

Purpose and Scope

Temporary Capacity Restrictions (TCRs), an umbrella term in the railway sector for various types of construction works and events which lead to a reduction of infrastructure capacity, are one of the main disrupting factors in timetabling: Even though they ultimately contribute to establishing a sound and stable rail infrastructure, as a short-term and mid-term result numerous trains have to be rerouted, replaced or even cancelled on their account and passengers as well as the freight traffic are confronted with a reduced quality of the transport or even with non-communicated delays. Particularly in an international context, TCRs play a major role as due to the deployment of various planning systems and a lack of communication - the cross-border traffic is affected even more strongly.

Key factors to decrease the effects of TCRs by simultaneously increasing the quality and stability of international train timetabling are:

- careful planning of TCRs,
- improved coordination of TCR among countries and their publication in due time before the timetable changes.

With regards to these key factors the TCR Working Group (TCR WG) of RailNetEurope (RNE), a European association which aims to enhance the quality and the efficiency of the international rail traffic decided to set up a web-based platform which should focus on resolving the negative effects triggered by TCRs. Being the first international application treating TCRs and their consequences this platform should foster the information exchange and the coordination of internationally relevant TCRs as well as the timely publication of TCRs on the European-wide network.

Functionalities and impact of the TCR-tool

The specifications of the web-based TCR-tool cover three fundamental functionalities:

- Firstly, the tool gives a graphical overview of all European-wide planned TCRs on the national and international main axis, for instances by using maps or charts. Within the graphical overview also the consequences of TCRs for traffic will be displayed and certain filters allow a user-related display. It is important to note that the provided graphical overview will not be exclusively available to Infrastructure Managers (IMs) but to Railway Undertakings (RUs) as well in order to enable them to adapt their traffic concepts in accordance with the TCRs and their impacts.

- Secondly, the TCR-tool foster the exchange of crucial information between IMs since it also provides information about TCRs in neighboring IMs and their impact on traffic. In this regards a notification system is implemented to ensure an up-to-date information base and to continuously inform the users about possible amendments.

- Thirdly, the application shall support the harmonization of TCRs between IMs by installing a feature which requires the approval of an affected IM in case a new TCR is generated or an existing TCR has been modified. Thereby, the affected IM needs to agree on the impact on the capacity availability for traffic on the one hand and on times when to develop and offer alternative timetables on the other hand.

Containing these major functionalities the TCR-tool is not only useful for the coordination and publication of TCRs between IMs but will also generate value for RUs as it provides RUs one single platform in which each customer could find harmonized information (in contrast to the
current a situation where a customer has to review different Excel lists of various RFCs in order to assess the impact of TCRs for his traffic concepts).
In addition, for smaller IMs which have no national tool available to plan TCRs the TCR-tool could even be applied to support national purposes.

Although the TCR-tool has to take certain obstacles to success it is already considered to be a great advancement for the railway sector. Being the first internationally used IT-tool to manage, coordinate and communicate TCRs it adds significant value to the timetabling process by decreasing the negative impacts of TCRs for both passenger and freight traffic.

In summary, the TCR-tool considerably contribute to an enhanced quality of timetabling and - together with the TTR programme – completely reshape today’s world of planning capacities of the railway.

HELP FACILITIES

In a case that you have some problems working with TCR Tool, you can send the description of the problem (together with the screen shot, if needed) to the next mail address:

support.tcr@rne.eu

The problem will be sent to the RNE incident management system and you will get information that your problem is received. In the incident management system, a ticket with a problem will be created and sent to the first level support.
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCR</td>
<td>Temporary Capacity Restriction</td>
</tr>
<tr>
<td>RNE</td>
<td>RailNetEurope</td>
</tr>
<tr>
<td>TTR</td>
<td>Redesign of the international timetabling process’</td>
</tr>
<tr>
<td>RFC</td>
<td>Rail Freight Corridor</td>
</tr>
<tr>
<td>.xml</td>
<td>Extensible Markup Language</td>
</tr>
<tr>
<td>.xls</td>
<td>Microsoft Excel file format</td>
</tr>
<tr>
<td>IM</td>
<td>Railway Undertaking</td>
</tr>
<tr>
<td>RU</td>
<td>IM_User Infrastructure Manager User</td>
</tr>
<tr>
<td>IM_User</td>
<td>Infrastructure Manager User</td>
</tr>
<tr>
<td>IM_Admin</td>
<td>Infrastructure Manager Administrator</td>
</tr>
<tr>
<td>UIC</td>
<td>UIC International Union of Railways</td>
</tr>
<tr>
<td>ID</td>
<td>Identification</td>
</tr>
<tr>
<td>OU</td>
<td>Organisation Unit</td>
</tr>
<tr>
<td>GIS</td>
<td>Geo Information System</td>
</tr>
<tr>
<td>TAF/TAP TSI</td>
<td>Telematic Applications Freight/Passenger Technical Specifications for Interoperability</td>
</tr>
<tr>
<td>CAD</td>
<td>Computer aided design</td>
</tr>
</tbody>
</table>
1. TCR WebTool V2.0 – User Manual

1.1. Login user and TCR cockpit

1.1.1. Logon users

The login functionality verifies that only registered users are able to login into the TCR tool.

Following actions are necessary to log-in.

<table>
<thead>
<tr>
<th>#</th>
<th>Action</th>
<th>Expected result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open the login screen of the TCR tool (<a href="https://tcr-online.rne.eu">https://tcr-online.rne.eu</a>)</td>
<td>The login screen is opened.</td>
</tr>
<tr>
<td>2</td>
<td>Fill in valid user credentials and click on the &quot;login&quot; button.</td>
<td>The user is logged in and the dashboard is shown.</td>
</tr>
</tbody>
</table>

![Login screen](https://tcr-online.rne.eu)

Figure 1 - Log-in screen

1.1.2. TCR Cockpit

What do you see in the TCR cockpit?

After successful log-on, the user specific dashboard page within the TCR cockpit shall be opened.
The cockpit is structured in 4 major areas:

1. Clickable logo – return back to the very first page (main cockpit)
2. Tasks links, filters and predefined reports and views – navigation section (My Do-Do’s, Company To-Do’s, Creation of TCRs, TCR Overview and Reports)
   "Company To-Do’s” versus “My To-Do’s”
   - Company To-Do’s -> IM worklist (list of TCRs) accessible for all users allocated to an IM
   - My To-Do’s  -> private worklist (list of TCRs) only accessible by the single user – to modify TCRs that have to be taken out of the “Company To-Do’s” to set responsibility.
3. Action Buttons and Menus bar – action section (New, Open, Save,… Log-out, User credentials)
4. Information screen – data section (TCRs, Calendar view, generated lists,…)

1.2. Administration

The administration allows the configuration of various data required for the operation of the TCRTool.
This includes managing users/roles and their individual permissions, languages as well as attributes of fields.
1.2.1. User/Roles concept

The TCR-Tool allows the configuration of application users. Users can be assigned to different roles, which have different application rights. Detailed information can be found in the following subsections.

1.2.1.1. Hierarchical structure

The hierarchical structure in the TCR-Tool is based on organizational units, roles and users. Each organizational unit can have up to n sub-organisational units (e.g. multiple IMs and RUs within a country) assigned. Furthermore, users can exercise up to n roles within an organisational unit. To depict RNE’s and its member’s business logic, the structure shown in Figure 3 is outlined.

- A user with the Administrator role creates countries on the organisational unit level.
- An additional country administrator is assigned for each country and defines companies (IMs, RUs, allocation bodies, etc.), which operate on a national level. Also, a country-specific UIC-Code 920-14 (80 Germany, 81 Austria, 84 Netherlands, etc.) can be mapped to a country. This UIC-Code is automatically linked to
  - the IM reference ID (ensuring to keep a unique ID in the database),
  - the locations assigned to the country (only locations of the respective country are shown and selectable),
  - the longitude/latitude coordinates for the GIS-map (upon opening the GIS-viewer, the picture section focuses on the respective country).
- Company administrators (e.g. IM_Admin role) are responsible for the creation of users and the assignment of an arbitrary amount of roles to them.
1.2.1.2. Configuration of roles

For each role, specific rules/permissions regarding read/write options and visibilities can be configured to support the desired configuration of user/roles variations. The TCR-Tool will be implemented with the roles and the according to permissions as shown in the table below.

<table>
<thead>
<tr>
<th>Roles</th>
<th>Create/Change/Modify TCRs</th>
<th>Import</th>
<th>Read TCRs</th>
<th>Cancel</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>any TCR</td>
<td>any TCR from my IM</td>
<td>my IM TCR</td>
<td>any TCR</td>
<td>any TCR from my IM</td>
</tr>
<tr>
<td>Administrator</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>IM_ADMIN</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>IM_USER</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>RU_ADMIN</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>RU_USER</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Front end view</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Import role</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>RFC Coordinator</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 - User/Roles matrix to be implemented

As shown in the table above, each role has its own set of permissions. If a user has assigned multiple roles, the overall permission for this user derives from the sum of the partial permissions.

For instance, and according to Table 6, a user with the assigned roles IM_User and Import role has every permission of the IM_User role and in addition, the user is also able to import TCRs of the own IM.

1.2.2. Creation of user and application of roles

To create users or modify user-roles it is necessary to be logged in with administration rights. The cockpit view will be slightly different when logging in as an administrator. A new icon shall be visible (red marked - 1).

![Figure 4 - Admin icon](image)

To create a new user following steps must be taken:

1.) Click the Admin icon (Figure 4)
2.) Select “User admin”
3.) Log in with “Admin” credentials a second time
4.) Select under “Organization” the link “Users”
5.) The list of users shall be shown.
6.) Click “New” in the action section. A new window shall open
7.) Enter user credentials and click on “create” – the window changes its view.

8.) Now the general information can be inserted.
9.) Next step is to assign the roles. Therefore select the “Roles” tab and further click on “+”(1) to open the respective menu.
10.) A new window opens and the respective role and the organisational unit can be selected.

11.) Finish this step by click on “Apply” in the right corner at the end. Several roles can be added just to repeat the above-mentioned steps.

### 1.3. Dashboards

The dashboard page shall allow the user to provide an overview of the user’s tasks and ongoing activities. The dashboard can be modified according to user needs. The dashboard content is the first content that the user sees after successful login to the TCR tool. Each time the user can return back to the dashboard by clicking at the RNE logo.
1.3.1. Selection of Dashboard

For the selection of predefined dashboards click on button “open” in the action and menus bar. Then select:

- Dashboard 1 = Tables: TCRs in the state “Publication” and Updates to TCRs in the state “Publication”
- Dashboard 2 = Tables: New TCRs, My TCRs and Upcoming TCRs
- Personnel dashboards

1.3.2. Create your personnel dashboard

The following steps shall present the way to create your personnel dashboard:

1.) Delete all items on your current dashboard by click on the “x” button.
2.) To create or modify your dashboard click on “Save” button – a window opens “Properties”.
3.) Modify the Name (e.g. MyDashboard1) and tick “Save as”
4.) A further step is to choose the number of columns (e.g. 2)
5.) Click on “Safe and close” – the dashboard is created
6.) To modify your dashboard, click on “New” button – a window opens “New Entry”. Select the item you need (Report, Calendar, Worklist overview, appointments, news). The item will appear on your dashboard. Repeat this step for further items
7.) By using drag and drop the item can be moved.
8.) Click again on “Save” and select “Default”  Dashboard user for “User Name” in order to set this dashboard as your new default Dashboard.
9.) Click on “Save and close”

1.4. Create TCRs

A new TCR can be either created directly via a form in the TCR tool or by selecting an MS Excel file in xlsx-format from the user’s local file system or via a .xml interface.

Note: that the system automatically detects parallel TCRs based on the time span and section of conflicting TCRs.

1.4.1. Via form

For creating a TCR via the from:

1. Select the “Manual input” of a TCR opens a standardized form. This form guides the user through the creation process of a new TCR and is divided into various sections for different types of business data as shown in the figure below. Mandatory fields are displayed bold.
2. When clicking on “Start process” the form is validated. Mandatory fields, which are not filled in, are highlighted with a red font colour upon submitting the form.
3. If all mandatory fields are filled the TCR is created and put in “My To-Do’s” in “Processed & Released” list.
4. In the “Processed & Released” list, the TCR can be directly approved (click on “Complete” button) or reassigned (click on “Reassign” button) to another person for approval (Further detail in regard to the “My To-Do’s” find under Error! Reference source not found.)
Figure 6 - Standardized form for manually inserting TCRs
1.4.1.1. TCR main data

This section provides main information about the TCR including a unique identifier, the reason for restriction and an optional description.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
<th>Free Editing / Data Validation</th>
<th>Mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM reference ID</td>
<td>Shows the UIC code 920-14 for the respective IM in a read-only field followed by a reference for the project ID in a free text field.</td>
<td>Free text, no validation</td>
<td>Yes</td>
</tr>
<tr>
<td>IM project ID</td>
<td>References to the project ID of the TCR issuing IM.</td>
<td>Free text, no validation</td>
<td>No</td>
</tr>
<tr>
<td>Reason for restriction</td>
<td>Gives an indication about the works regarding the TCR. Hovering over the question mark icon next to the label shows the following description: *) mainly for rebuilding of stations or new infrastructure **) e.g. works on platforms, walls, noise protection walls, special installations, etc.</td>
<td>One of the given values can be selected.</td>
<td>Yes</td>
</tr>
<tr>
<td>Description</td>
<td>Brief description of the TCR.</td>
<td>Free text, no validation</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 2 Field definitions for the TCR main data

1.4.1.2. Spatial expansion of the TCR

The content of this section governs the spatial expansion in terms of the affected location/s, section, direction, affected border and affected IM.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
<th>Free Editing / Data Validation</th>
<th>Mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location from</td>
<td>Defines the beginning location of the TCR. Only locations associated with the country of the issuing IM are displayed. The globe button opens the GIS-map allowing the user for selecting a location by clicking on it. The respective location value is automatically filled in in the form field. If the data of the current TCR causes a conflict with another TCR regarding this field, an exclamation mark icon is displayed. By clicking on the exclamation mark, a pop-up shows the details (Date/Time from/to, Location from/to, Type of TCR) of the TCR which causes conflicts. Independent of the conflict, the TCR can still be inserted.</td>
<td>One of the given values must be selected.</td>
<td>Yes</td>
</tr>
<tr>
<td>Location to</td>
<td>Definition of the ending location of the TCR. Only locations associated with the country of the issuing IM are displayed. The globe button opens the GIS-map allowing the user for selecting a location by clicking on it. The respective location value is automatically filled in in the form field. If the data of the current TCR causes a conflict with another TCR regarding this field, an exclamation mark icon is displayed. By clicking on the exclamation mark, a pop-up shows the details (Date/Time from/to, Location from/to, Type of TCR) of the TCR which causes conflicts. Independent of the conflict, the TCR can still be inserted.</td>
<td>One of the given values must be selected.</td>
<td>Yes</td>
</tr>
<tr>
<td>Section</td>
<td>Defines the section, within where the TCR occurs. This information is automatically derived from the chosen Location from/Location to value. If more than one section is derived, the user must select at least one of the options but is also able to select multiple section items.</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Direction</td>
<td>Defines, which direction of the section is affected by the TCR (bi-directional, direction towards starting point of the location, direction towards end point of the location).</td>
<td>One of the given values must be selected</td>
<td>Yes</td>
</tr>
</tbody>
</table>
1.4.1.3. Temporal expansion of the TCR

Time-based data and the temporal behaviour of the TCR are added in this section. A button to reset the temporal expansion of the TCR is displayed allowing clearing all entries in this section in order to make adaptions.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
<th>Free Editing / Data Validation</th>
<th>Mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of TCR</td>
<td>Defines the temporal expansion of the TCR. See paragraphs below this table for further information regarding the different types of temporal expansions of a TCR. If the data of the current TCR causes a conflict with another TCR regarding this field, an exclamation mark icon is displayed.</td>
<td>One of the given values must be selected</td>
<td>Yes</td>
</tr>
<tr>
<td>Time</td>
<td>Defines, whether the time for the TCR is known or unknown. Note: the option to select an unknown time for periodical continuous TCRs is not available since it does not enable any additional scheduling information, which could not be covered with the combination “Periodica” and “Exact time unknown”.</td>
<td>One of the given values must be selected</td>
<td>Yes</td>
</tr>
<tr>
<td>Date from</td>
<td>If the exact time of a TCR is known, a date/time range can be defined. A combo box allows selecting the Date to value.</td>
<td>The selected value must have a valid date. Incorrect information is highlighted.</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Time from</td>
<td>If the exact time of a TCR is known, a date/time range can be defined. A combo box allows selecting the Time from value.</td>
<td>The date field must be entered and the selected value must have a valid time.</td>
<td>Yes</td>
</tr>
<tr>
<td>Date to</td>
<td>If the exact time of a TCR is known, the Date/Time to information can be defined using this date and time picker.</td>
<td>The selected value must have a valid date. Incorrect information is highlighted.</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Time to</td>
<td>If the exact time of a TCR is known, a date/time range can be defined. A combo box allows selecting the Time to value.</td>
<td>The date field must be entered and the selected value must have a valid time.</td>
<td>Yes</td>
</tr>
<tr>
<td>Year from</td>
<td>If the exact time of a TCR is unknown, a year/week range can be defined. A combo box allows selecting the Year from value.</td>
<td>-</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Week from</td>
<td>If the exact time of a TCR is unknown, a year/week range can be defined. A combo box allows selecting the Week from value.</td>
<td>-</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Year to</td>
<td>If the exact time of a TCR is unknown, a year/week range can be defined. A combo box allows selecting the Year to value.</td>
<td>-</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Week to</td>
<td>If the exact time of a TCR is unknown, a year/week range can be defined. A combo box allows selecting the Week to value.</td>
<td>-</td>
<td>Conditional mandatory</td>
</tr>
<tr>
<td>Working days</td>
<td>Selecting either a periodic or a periodic continuous TCR allows the user to define specific working days.</td>
<td>-</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 4 Field definitions for the temporal expansion of the TCR

<table>
<thead>
<tr>
<th>Weekly interval</th>
<th>Defines the weekly interval of the planned works. E.g. 2 would mean, that the works happen every other week.</th>
<th>-</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>Self-calculated indication of the total amount of time for the TCR. Note: The duration field in the Excel-file is currently filled in manually and there is no particular form on how this information has to be given (e.g. 11 days, 9 d, 600 min., 270/300', 1 week-end, etc.). Because of this circumstance, the TCR-Tool is not able to interpret and validate free text. Therefore, the duration information upon the import will be inserted without validation of the factual accuracy. However, if the information regarding the temporal expansion is changed in the TCR-Form, the system automatically computes the right duration and overwrites the imported value. For TCRs with a known exact time the duration is displayed as follows as a read only information:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Continuous TCRs: ( \text{sum of days/hours (e.g. } 15d+4h) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Periodical TCRs: ( \text{sum of repetitions, duration (in hours) of each work and weekly interval (e.g. } 12x 4h \text{ every 2 weeks}) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Periodical continuous TCRs: ( \text{sum of repetitions, amount of days/hours per repetition and weekly interval (e.g. } 12x 5d \text{ – every 3 weeks}) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For TCRs with an unknown exact time an indication regarding the duration can be given manually. Note: As this information is given as free text, no validation regarding the content is made.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Free text, no validation No

The user can choose one of the following scenarios as shown below:

Figure 7 - Scenario selection for the temporal expansion of the TCR

a) Continuous
These events are characterized in a way that they occur non-stop during the TCR (e.g. a complete closure of a track from 01.07.2017 to 01.09.2017).

b) Periodical
The characteristic of this event is described with a repeating pattern (e.g. work activities happen each Saturday and Sunday from 02:00 to 04:15). For periodical works, specific working days can be selected with check boxes, where each checkbox represents the beginning day of each work. In the case of the given example with works on Saturday and Sunday from 02:00 to 04:15, the checkboxes Sat and Sun need to be ticked (not Sat, Sun and Mon). A help-text (tool-tip) is displayed when hovering over the label for working days and giving a brief description about the logic behind the temporal expansion of the TCR.
c) Periodical continuous

This event is a hybrid form of the events named above (e.g., a TCR includes works, which happen every other week, continuously for four weekends from Friday 23:00 to Monday 05:00). For this type of TCR the periodicity arises from the weekday selected in the date/time picker for the start and end date of the TCR. E.g. selecting Friday 25 August 2017, 23:00 as beginning date/time and Monday 18 September 2017, 05:00 as end date/time implies that works happen periodically each Friday to Monday continuously from 23:00 to 05:00 in the time span 25 August to 18 September. A help-text (tool-tip) is displayed when hovering over the label for working days and giving a brief description about the logic behind the temporal expansion of the TCR.

Choosing one of the described scenarios provides the user a selection regarding the duration of the TCR. Depending on whether the exact time is known/unknown different options for the temporal expansion of the TCR are offered as shown in the following figures.

Figure 8 - Provided selections for the duration of a continuous TCR

Figure 9 - Provided selections for the duration of a periodical TCR
a) Exact time known - A date and time picker allow defining a specific date/time from/to timeframe using local time.

b) Exact time unknown - Combo boxes are displayed to limit the temporal expansion of the TCR in terms of year/week from/to.

c) Working days - Selecting a periodic or periodic continuous TCR allows to define working days via check boxes. Hovering over the question mark icon next to the label displays the user a short description regarding the business logic behind this field.

d) Weekly interval - Selecting a periodic continuous TCR requires the definition of the weekly interval of the planned works in a text field. Hovering over the question mark icon next to the label displays the user a short description regarding the business logic behind this field.

1.4.1.4. Operational consequences

Information regarding the consequences of the TCR on the operations is given in this section. This includes the impact on traffic, classification of impact, traffic measures, necessary deviations and the incorporation of traffic measures in the yearly timetable.
<table>
<thead>
<tr>
<th>Field name</th>
<th>Description</th>
<th>Free Editing / Data Validation</th>
<th>Mandatory</th>
</tr>
</thead>
</table>
| Impact on traffic | Defines the impact on the traffic triggered by the TCR. The following impacts can be defined:  
- Reduced track availability  
- Weight, Length, Profile  
- Total closure  
- Speed restrictions  
- Diesel only  
For the associated labels of checkboxes descriptions are displayed, when hovering over the respective label. | At least one of the given values must be selected. | Yes |
| Impact on traffic – Affected estimated travel volume | As part of the impacts on traffic, an estimation regarding affected travel volume as a percentage value can be defined. This field is only used for the manual creation of TCRs and does not affect the import of TCRs from external sources. | Only positive numbers are accepted. Three characters as maximum. | No |
| Classification | Classifies the impact of the TCR. By default, Major is selected. Hovering over the question mark icon next to the label shows the following description:  
**Major:** >30 days and >50% impact on the estimated traffic  
**High:** >7 days and >30% impact on the estimated traffic  
**Medium:** ≤7 days and >50% impact on the estimated traffic  
**Minor:** ≤7 days and >10% impact on the estimated traffic  
Annex VII: The infrastructure manager may apply more stringent thresholds.  
The values for Major/High/Medium/Minor have specified due dates, which can be managed by the administrator. The following due dates are used (referring to the beginning date of the TCR, not the end date):  
- TCR data editable  
- Due date for response  
- Due date for a TCR to be implicitly accepted  
By default, the following time values are defined in the TCR-Tool (Major/High/Medium/Minor):  
- TCR data editable  
  - x-24/x-24/x-13.5/x-6.5  
- Due date for response  
  - x-18/x-13.5/x-13.5/x-6.5  
- Due date for a TCR to be implicitly accepted  
  - x-17/x-12/x-4 | - | Yes |
| Traffic measures | Indication of traffic measures taken regarding the TCR.  
It has been agreed that the column Regional trains will be included in the data model but be set temporarily invisible. Furthermore, the label will be renamed to Commuter trains. Also, the import of TCRs using external sources only takes freight traffic into account. Passenger train related traffic measures are only defined when TCRs are created using the TCR form. Since the traffic measure “Others” is a too generic phrase with no provided additional information, this field will not be included in the form. | At least one of the given values must be selected. | Yes |
| Traffic measures – Estimated delays | As part of the traffic measures, an extra option to give an indication about the estimated delays for the different train types is available. | - | No |
Traffic measures – Define delay minutes

A text field to define delay minutes for the train type will be enabled once the respective checkbox Estimated delays for a train type has been ticked. Only positive integers are accepted.

Traffic measures – Define capacity to use

As part of the traffic measures, an extra capacity indicator option is available. It allows the user to enter how the remaining capacity should be allocated to the different transportation modes. It has been agreed that this capacity usage indicator will be included in the data model but be set temporarily invisible. The total percentage for the capacity to be used is limited with 100%. If this value is exceeded the field label will be highlighted.

Deviation location

Defines a location within the own network, where the rail traffic shall be re-routed. Clicking on the plus-icon (“+”) adds an additional combo box to select another instance for a deviation location. One of the given values can be selected.

Deviation border

Defines a border, where the rail traffic shall be re-routed. Clicking on the plus-icon (“+”) adds an additional combo box to select another instance for a deviation border. Selecting a Deviation border triggers the harmonisation process. One of the given values can be selected.

Additional comments to deviation

Gives an addition to the deviation selection. Field will be enabled once Deviation location or Deviation border has been selected. Free text, no validation.

International coordination

Gives an additional information regarding the international coordination. Field will be enabled once the international harmonisation process has been triggered. Free text, no validation.

In annual timetable

Selection whether the TCR has been incorporated in the annual timetable.

Indication of timetable adaption

Gives an indication when the timetable shall be adapted. Field will be enabled once “No” has been selected for the field In annual timetable. Selected value must have a valid date. Incorrect information is highlighted. Conditional mandatory.

Table 5 Field definitions for operational consequences

1.4.1.5. TCR Status bar

The TCR Status is an information bar only.

Figure 12 - Provided sections TCR status and the publication date
1.4.2. Via GIS map (as part of the creation process of a TCR)

When a user creates or modifies a TCR, the TCR form allows for the fields “Location from” and “Location to” to select a location in the GIS viewer. There are globe-buttons (red marked 1 in the following figure) next to the mentioned input fields. Once the user clicks the button, the GIS viewer opens and shows the topology. The map is focused on the country of the logged-on user (e.g. Netherland) but does not show any existing TCR’s.

By clicking on one of the locations shown on the map, the selected name of the location appears in the pop-up window and is presented as start or end point depends on clicking the “Start” or “End” button in the pop-up window (red marked 2 in the following figure). The chosen locations are set in the corresponding field in the TCR form. The “Close” button is used to close the pop-up window on the map.

Figure 13 - Provided sections TCR status and publication date
1.4.3. Via *.xls (Excel file)

To manually import TCRs in *.xls or *.xlsx (RNE standard), the Excel file used for importing a TCR needs to follow a pre-defined structure (see the defined structure under Error! Reference source not found.).

Following steps are necessary:

1. Click on "Document upload" (red marked-1)

![Figure 14 - Upload TCRs via .xls file](image)

   - Click the button near to file field ( ).
   - A file browser window is opened. Use the file browser window to select the Excel template mentioned in the precondition.
   - The "Excel" file has been selected (red marked-2).
   - Click the "Validate" button to process the chosen file.
   - In case of errors, the TCR tool responds with a detailed error report (figure 15). The error report gives a detailed explanation of what is wrong and should be corrected before a next upload.
7. After correcting all errors, start again from step 1 (by clicking the “Document upload” button) 
8. If no validation and/or consistency errors occur after the validation, the “Import” button will be 
available in the bottom of the report (marked red in figure 15).
9. Click on “Import” button for the recently uploaded and validated file.

10. Check the label “Processed & Released” under the “Company To-Do’s” in the navigation menu. After the file has been processed, the label is written with bold letters indicating that a new dataset is added (see figure 17).

11. The recently imported TCRs are displayed in the “Processed & Released” list by records in bold.

Figure 17 - Data was uploaded

Figure 18 - A new imported data records
In case you try to import file with data that are already imported into the TCR tool, the tool will give you warnings for each record that is already imported (figure 19).

![Figure 19 - The TCRs are already imported into the tool](image)

If you need to make some modification on already imported record/s and import these records again in the tool, it is possible. It is needed to do the necessary modification in the excel file and after that, you have to update the “Last updated” cell with a new date in each row in which you did changes.

![Figure 20 - Upload already imported data](image)

The same procedure that is written above (from step 1) should be followed.

### 1.4.3.1. Details on validation

After processing the document import, the user will be informed via a validation report if any errors occurred. Basically, the upload will validate against:

- the user’s authorisation to create a new TCR depending on the provisioned transactional data
- if there are any mandatory attributes not provided in the import template
- if there are consistency issues with related master data

An imported TCR is created in the state *imported*. 

 Created by mario.toma@rne.eu

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An import of TCRs from an Excel File will be done in two basic steps:

1. Validation: Scan the Excel file and check data consistency.
   A report will be generated which contains a list of identified errors and warnings. If the report contains errors, the user must correct the data in the import file (either by changing the data in a national system which produces the import file, or in the file directly). No data is created in the system. The updated file shall be validated as long as the report contains no errors.

2. Import: When the validation report contains no errors, the TCRs defined in the file are created in the system. A workflow is started for each imported TCR.

The import-validation parses through all TCRs in the Excel file row by row and performs some checks for each line. The result of the checks is written into the validation report. The following validation-phases are performed for each row (=TCR) in the given order:

- **Syntactic Checks:** all columns of the Excel file are checked to comply to the allowed type / values. This check will e.g. identify if a numeric field contains other characters than [0-9].

- **Semantic Checks:** all columns of the Excel file are checked to comply to the constraints defined in the table on page 21-22. This check will e.g. identify if a mandatory field is empty.

- **Checks against existing data:** all rows are checked as illustrated in the following figure. During this phase, each TCR in the import will be checked one by one. The currently checked TCR is called TCR-I in the illustration. The goal is to check which import mode shall be applied to the TCR-I. Possible modes are:
  * NEW: no TCR exists in the DB with the same ID as TCR-I
  * UPDATE: there exists a TCR-DB in the database with the same ID as TCR-I. This TCR-DB will be updated according to the values of TCR-I
  * CANCEL: there exists a TCR-DB in the database with the same ID as TCR-I. This TCR-DB will be cancelled
  * IGNORE: the TCR-I will not be imported

Furthermore, the check identifies conflicting situations by raising an ERROR for TCR-I, e.g. if a TCR-DB shall be updated which is not editable by the importing IM.
Figure 21 - Checks against existing data

The import validation is executed row by row on all TCRs of the Excel file. The validation-phases are executed in the order given above. If one of the phases results in an ERROR, the subsequent phases are skipped. The result of the validation is summarized in a report of the following structure:
Table 6 Structure for results of the validation process

<table>
<thead>
<tr>
<th>Row# (TCR ID)</th>
<th>Syntax</th>
<th>Semantic</th>
<th>Data</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1452342)</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>NEW</td>
</tr>
<tr>
<td>4 (983249)</td>
<td>OK</td>
<td>No Match for Location From (Column F) found Direction (Column E) shall not be null</td>
<td>OK</td>
<td>IGNORE</td>
</tr>
<tr>
<td>5 (3453245)</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
<td>UPDATE</td>
</tr>
<tr>
<td>6 (234734)</td>
<td>OK</td>
<td>TCR 94563212 currently assigned to IM B</td>
<td>OK</td>
<td>NEW</td>
</tr>
<tr>
<td>7 (94563212)</td>
<td>OK</td>
<td>WARNING: Calculated duration does not match given duration</td>
<td>OK</td>
<td>NEW</td>
</tr>
<tr>
<td>8 (34534234)</td>
<td>OK</td>
<td>WARNING: Calculated duration does not match given duration</td>
<td>OK</td>
<td>NEW</td>
</tr>
</tbody>
</table>

Each row (=TCR) in the report is colour-coded:
- If no errors or warnings occurred, the row is marked green.
- If the row will be ignored for the import, the row is marked yellow.
- If a warning occurred during one of the checks, the first column and the column of the corresponding check is marked orange. The same concept applies to errors, except that the columns are marked red.

1.4.3.2. Conflict solution

When creating a TCR via the TCR form, data validation routine checks if the entered data for the new or updated TCR causes a conflict with already submitted TCRs. The validation routine is as follows:

when a TCR is created or updated, the timespan and the section of the planned TCR are validated against all existing TCRs that are not in status cancelled. In case there are already one or more existing TCRs in the same time span and section, the user will be informed with a dialog window.

The information in this dialog includes the IM reference ID, the spatial/temporal expansion of the TCR and a link to open the respective TCR. The dialog window offers the user to apply the new/updated data or to change the timespan/section for the respective TCR. If the user applies the data, which cause a conflict with existing TCRs, an exclamation mark icon is displayed next to the affected data field. If the TCR is created/updated by the import functionality and conflict is identified, a WARNING will be added to the validation report.
1.4.4. Via *.xml

The import can be done via manual XML import. The procedure is the same as for the import of the Excel file above.

To manually import TCRs in *.xml (TCR XSD based on TAF/TAP- TSI standards), the following steps are necessary:

1. Click on “Document upload”
2. Select the file XML file
3. Click the “Validate” button to check if there are consistency issues with related master data.
4. In case of errors, the TCR tool responds with a detailed error report (figure 15). The error report gives a detailed explanation of what is wrong and should be corrected before a next upload.
5. If no validation and/or consistency errors occur after the validation, the “Import” button will be available in the bottom of the report (marked red in figure 15).
6. Click on “Import” button for the recently uploaded and validated file.
7. Check the label “Processed & Released” under the “Company To-Do’s” in the navigation menu. After the file has been processed, the label is written with bold letters indicating that a new dataset is added (see figure 17).
8. The recently imported TCRs are displayed in the “Processed & Released” list by records in bold (figure 18).

1.5. TCR Overviews

TCRs can be displayed in two separate ways. Using specific overview types to give the user a comprehensive summary of TCRs (figure 22) and second, a detail view allowing for capturing all relevant TCR data.

For displaying TCR in an overview, the following three different presentation types are provided:
- a list view,
- a map view (GIS based) and
- a Gantt view.

These overview functionalities are accessible via the “Show/Search TCRs” navigation menu (red marked-1) and selecting the respective view (red marked-2).

The “List view” and “Gantt view” have a common search form, that appears by clicking at the “Search TCRs” button (red marked-3) and results of a search are presented in both views in the result pane (red marked-4). This means, changing between these two views, the search results will be the same, even the presentation is different.

The “Map view” has its own search pane, but the result will be preset on the result pane (red marked-4).

The detail view for a TCR can be retrieved out of every overview type. The visibility of TCRs depends on the visibility permission of the user’s role (see chapter Error! Reference source not found.).
The "List view" displays the list of TCRs in a table form with the most used attributes. Users can show/hide the additional attributes by their needs.

To present the “List view”, it is needed to click on the “Show/Search TCRs”. The first view that is presented is the "List view" with a list of all TCRs.

The "List view" has the following attributes that are presented by default:
- ID – the unique id of the TCR
- IM reference ID – ID that IM is using in their national tool (could be used for the automatic synchronization between national and central tool)
- Reason for restriction
- Location from
- Location to
- Affected IM
- Involved RFC
- Date/Time from
- Date/Time to
- Total closure

In any case, it is possible to add additional attributes to view or to hide attributes already displayed. To do that, the user has to click the “Column picker” button (“+” button) and select or deselect attributes (figure 23).

The selected attributes will be shown/hidden from the list. Additionally, by clicking the column header (column name), the list results will be sorted by the ascending/descending order of the selected column.
1.5.1.1. Search TCRs form

To search the specific TCR, a quick search text field with the search button ( ) should be used (red marked-3 on figure 22). Using a quick search, only “IM reference ID” will be searched for the entered value. It is important to say that it is possible to search for a whole or a part of value inside the “IM reference ID” field.

To search/filter for TCRs in more details, the “Search TCRs” button should be used (red marked-3 on figure 22). The following form will popup.
Using the “Search for TCRs” form, users can search TCRs by different attributes.

By default, the period of 6 months is selected (from the current date). For the purpose of fast data enter and search for a specific period, the following “Time” buttons at the top of the form are added (red marked-1 on figure 24):

- “d” – a one day period
- “w” – a weekly period
- “m” – a monthly period
- “q” – a quarterly period
- “y” – a yearly period
- “<” – a previous period (related to the “from” and “to” values)
- “>” – a previous period (related to the “from” and “to” values)

Click on these buttons, the “from” and “to” values will be changed accordingly, by calculating from the current date (e.g. if the current date is 13th June 2019, clicking at the “d” button the next day – 14th June 2019 will be presented in the “from” and “to” fields, or by clicking at the “w” a period from 13.06.2019-19.06.2019 will be presented, etc).

Two additional buttons are used to select a previous (“<”) or next (“>”) period relative to the selected period. These two buttons are only effective if the period (“from” and “to” values) is atomically filled by clicking one of the “Time” buttons. In the case of manual change of one of these values, these two buttons will be disabled.

Explanation of the other attributes:

<table>
<thead>
<tr>
<th>ID</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time</td>
<td>The following buttons can be used to automatically enter a valid date “from” and “to” for the period to be searched for TCRs:</td>
</tr>
</tbody>
</table>

- ![Reset button](image)
  - Reset the entered values (period) to the current date
- ![Day button](image)
  - A next day of the current date
- ![Week button](image)
  - A weekly period starting with a current date
- ![Month button](image)
  - A monthly period starting with a current date
- ![Quarter button](image)
  - A quarterly period starting with a current date
- ![Year button](image)
  - A yearly period starting with a current date
- ![Previous button](image)
  - A previous period of the currently selected period in the “from” and “to” fields. The button is available only if the values are set automatically by the buttons above. In any manual modification of the values, the button will be disabled.
- ![Next button](image)
  - A next period of the currently selected period in the “from” and “to” fields. The button is available only if the values are set automatically by the buttons above. In any manual modification of the values, the button will be disabled.

Definition of the search period:
The search period can be filled in automatically using the buttons for setting the values or manually. By default, the date period is set to 6 months (starting from the current date) and time is set to 24 hours (a whole day). That means the TCRs for the following 6 months are presented in the result pane. Each TCR that exists in the required period will be displayed.

- Button to remove (reset) entered values from the date and time field

<table>
<thead>
<tr>
<th>T</th>
<th>Type</th>
<th>Search TCRs by types:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>- Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Periodical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Periodical continuous</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>IM</th>
<th>Searching the TCRs that affects a specific IM</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>RFC</th>
<th>The RFCs that are involved or affected by TCRs</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Sections</th>
<th>A user can add a section/s, to filter all TCRs that touches the entered sections</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>Reason for restriction</th>
<th>Searching TCRs by the reason for the restriction. The values are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>- Signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Catenary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Track and Rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Tunnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Miscellaneous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th>Visibility</th>
<th>Using the visibility option, it is possible to search for TCRs created by the user's IM or TCRs in which the user's IM is involved.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>only TCRs within my IM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>only TCRs my IM is affected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8</th>
<th>Location</th>
<th>It is possible to search for the TCRs that are created between the selected locations or touches one of the locations.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>Temporal expansion</th>
<th>Using the temporary expansion option, it is possible to define what kind of TCRs will be searched in a sense of defined time.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>The possible options are:</td>
</tr>
<tr>
<td></td>
<td>all</td>
<td>All TCRs will be searched, doesn’t matter if the date and time is exactly defined or not</td>
</tr>
<tr>
<td></td>
<td>known exact time</td>
<td>Only TCRs with the exactly defined time will be searched and presented</td>
</tr>
<tr>
<td></td>
<td>unknown exact time</td>
<td>Only TCRs without the exactly defined time will be searched and presented</td>
</tr>
</tbody>
</table>

It is important to highlight that the period that applies to the temporarily expansion is the same that is defined in the “Time” section (date and time defined by fields “from” and “to”). In the case of unknown exact time TCRs, the date and time that is defined in each TCR are calculated and compared with a period defined in the search section.

After clicking the “Apply search”, the tool starts with searching all the TCRs that satisfied the entered search parameters.
The “Cancel” button quits entering the search parameters and closes the search form.

### 1.5.2. Displaying in the GIS map view

#### 1.5.2.1. GIS map

The GIS map can be opened by pressing the button “Map View” (red marked). The map opens in the same window.

With the map view, the TCR Tool provides the functionality to gather information of TCRs in their geographical context.

<table>
<thead>
<tr>
<th>ID</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1  | Map picture section           | The picture section of the map (used maps are the license free OpenStreetMap and OpenRailwayMap) allows the users to gather graphical information of the RNE network and TCRs. The details shown on the map are depending on the following parameters:  
  - Zoom level  
  - Enabled/Disabled layers  
  - Set transparency  
  Basic TCR information (IM reference ID, the reason for the restriction, the location from/to, section and direction) can be retrieved by hovering over a TCR in the map. Clicking on a TCR in the map opens the detail view of the respective TCR. |
| 2  | Autofocus                     | Upon opening the GIS-map, the system automatically focuses the picture section on the country of the logged in user. By clicking on this button, the system re-focuses the picture section to this default view.                                                                                                                   |
| 3  | Zoom in/Zoom out slider       | Offers a zoom in/zoom out function. Depending on the zoom level, the GIS-viewer shows more or fewer details in regard to the sections, segments, locations and labels for the locations.                                                                                                                                             |
### Adding/Removing layers

This button allows adding/removing various layers including:
- Segments
- Sections
- TCR layer (displaying TCRs)
- RFC layers (each RFC can be displayed separately)

### Set layer transparency

Allows to individually set the transparency for each layer in order to highlight specific layer information. This function works in combination with adding and removing layers. For instance, the user is able to display all RFCs, but set the transparency for each RFC separately for contrast purposes.

### Search function

Present TCRs on the map based on respective search criteria.

### Export picture

Provides the functionality to save the current picture section as an image in the .png format based on the current settings (zoom level, enabled/disabled layers, layer transparency) to the file system.

### Scale information

Provides a scale information in meter based on the current zoom level.

### Rotate map

By clicking on this button, the user is able to rotate the map by inserting a rotation angle.

### Attributions

Displays map related copyright information.

### TCRs presentation

Presentation of TCRs on the map.

<table>
<thead>
<tr>
<th>Table 7 Description of the GIS-viewer functionality</th>
</tr>
</thead>
</table>

#### 1.5.2.2. Drawing the geometry of the GIS objects in the TCR tool

The geometry of locations, segments and sections for each RFC is defined by the imported datasets from CAD, respective the entities location, segment, section. Multiple layers can be displayed at the same time to display the entire topology. The following picture illustrates how locations, segments and sections are interpreted to draw the GIS object geometry:

---

**Figure 26 - Master data interpretation for drawing the GIS geometry**

TCRs in the GIS-view are colour-coded based on the different reasons for restriction according to the RNE Guidelines for Coordination including the information in regard to the temporal expansion. Furthermore, the type of TCR (continuous, periodical, periodical continuous) is distinguished where each line for the types are displayed differently:

- Continuous TCR: solid line
- Periodical TCR: dotted line
• Periodical continuous TCR: dashed line

Depending on the zoom level, the GIS viewer shows more or fewer details, as illustrated above. Locations are labelled by the location name. TCRs are illustrated in the map by colouring the affected segment(s) different than the other segments and are labelled by the start and end date of the TCR.

1.5.2.3. Search for TCRs

It is required to enter search criteria which TCRs shall be displayed on the map. For this reason the search mode in the GIS map has to be selected (magnifying glass).

The search criteria shall contain the following fields:

• Date from, Date to
• TCR Status
• Impact on traffic
• Traffic measures

Note: By holding the “STRG” button on the keyboard it is possible to select several items.

Figure 27 – Map View - search for TCRs

1.5.3. Displaying in Gantt view

The Gantt-chart is used to represent the temporal expansion of TCRs. The same searching parameters apply to the Gantt View as on the List View (check the topic 1.5.1.1.). TCRs, which match the search criteria, are shown in a list. The Gantt-chart window is divided into two sections:

• Data section
  By default, the Gantt-chart is opened in a compressed view, showing only sections on the y-axis. Planned TCRs within one section are summarized for overview purposes to one TCR in the compressed view. Sections are listed in ascending order based on the date
from attribute of the first TCR in the respective section. The user is able to expand each section-overview by clicking on the section name in order to gather detailed information about every single TCR within a section.

- Graphical section
  The header of x-axis shows the timeline of the selected time period (date from, date to). TCRs are displayed on the x-axis and represented with a horizontal bar, whose length is proportional to its temporal expansion. The left end marks the beginning of the TCR and the right end marks the completion date. Furthermore, specific colour-coding for the impacts on the traffic is applied to the TCRs allowing the user for getting a quick reading of the work priority:
  - Total closure → red
  - Reduced track availability/ LT → yellow
  - Reduced track availability/ST → yellow
  - Speed restriction → yellow
  - Profile → yellow
  - Length → yellow
  - Weight → yellow
  - Diesel only → yellow
  - In addition to this color-coding, the Gantt-chart distinguishes between the different TCR types. Continuous TCRs are displayed with full bars, periodical (continuous) TCRs are crosshatched.

General functionality of the Gantt-chart

The Gantt-chart is opened in a collapsed view. By default, all TCRs within one section are comprised of one single TCR item shown as one single. The data shown in the data section is reduced to the section information and the date from/date to information of the TCRs (chronologically derived from the first and last TCR in this section).

The TCR bar
The TCR bar shows a compressed view of all contained TCRs. By expanding the compressed view, all TCRs within the respective section are displayed in ascending order based on their temporal occurrence presenting the affected segments by the TCR, the time span, the type of the TCR as well as the issuing IM of the TCR. Also, each TCR within the section is displayed in one row, allowing the user for determining TCRs, which run sequentially (periodical), in parallel to each other or overlapping. Basic TCR information (IM reference ID, the reason for the restriction, the location from/to direction and traffic measures) can be retrieved by hovering over the bar of the respective item. Clicking on the TCR item in the data section or on the respective bar opens the detail view of the selected TCR.
Figure 28 - Gantt View
1.6. TCR detail view

A detailed view of a TCR can be accessed from the “Processed & Released” in “My To-Do’s” menu for the editing purpose, but also from the List, Gantt and Map view for reading purpose. The TCR detail view allows for capturing all relevant TCR data of the current step and state. The displayed information relies on the configured properties and fields of the data model. Currently responsible editors of TCRs are able to make changes to the TCR (e.g. change field entries or the state of a TCR). In the TCR detail view, the user can retrieve the following TCR information via a tab bar as shown in the following figure (red marked 1):

- **TCR detail**
  
  The TCR detail tab shows the TCR form, which is also used to manually create a TCR. For a user, it is possible gathering TCR information and making user interactions according to the current process step and the assigned user/role permissions. The information showed (data fields) in the TCR detail tab as well as the possible user interactions (changing data field values or the state of a TCR), within a certain process step, is derived from the workflow depicting RNE’s business rules. In order to process a TCR, which is in the user’s “My To-Do’s”, the user has to accept the process step by using the take functionality. This enables the processing of the tasks (e.g. making comments, changing the state of a TCR, approving/not approving at TCR, etc.) for the user according to the workflow model within the current process step.

  Once the user clicks on **Save and complete**, the current process step is finished and the next one in the workflow is initiated.

  **Note:** Only a user, who is currently responsible editor within a process step is able to process a TCR data set. This is to avoid that inactive users (i.e. users, who are not currently responsible editors) make changes to a TCR without permission. However, for a responsible editor besides
enabling the next process step, it is also possible to re-activate a previous step. If a user of a preceding step needs to make changes the TCR data set while another user is the currently responsible editor, the active user needs to reactivate the respective process step in order to hand the responsibility to the inactive user.

- **Documents**

This tab allows currently responsible editor of a TCR to update and manage documents for a TCR. Documents can be uploaded directly from various file sources (e.g. user's local file system, file shares, etc.). To avoid that documents are deleted by unauthorised users (e.g. users of external companies), documents are tied to the company attribute. This means that a document can only be deleted by a user assigned to company A when the initial uploader is also assigned to company A. Furthermore, the visibility of documents is related to the user/role permissions. To allow the management of documents, notes can be added and for traceability purposes, a versioning mechanism is implemented.

- **Notes/Comments**

Based on the user/roles concept (see section Error! Reference source not found.), users are able to comment on a TCR. In order to support a continuous commenting function, a user does not need to be the currently responsible editor of a TCR to write a comment. The displayed information of comment includes the subject, the content, a Created at date and a Created by indication. To avoid misunderstandings, a comment can not be edited or deleted by the issuing user after the comment has been submitted. To provide a consistent notification about new comments to TCRs (e.g. comments from RUs to TCRs after publication), the following function will be implemented:

- responsible IM personnel for TCRs are assigned to a configurable distribution list and will be notified via E-mail as soon as a new comment on a TCR of the respective IM has been submitted.
- as soon as a user makes a comment to a TCR (e.g. a user of a RU), the respective user will automatically be informed via E-mail about every new comment on this particular TCR.

- **History**

Each change of a TCR within its life cycle is logged and documented in the TCR-Tool. This includes the information about the activity (e.g. change of process steps), the field/s affected by the change (old values can be compared to new values), as well as the application user (“form change” → red marked 1 → e.g. result see red marked 2). Every change is marked with a timestamp to keep a complete history of all changes to a TCR. In addition, the position of the respective step in the process can be displayed including when an action has been taken, started and finished. By default, the user’s name and role in regards to action are displayed.

Note: For privacy reasons, the name attribute is anonym and not be displayed to any role except for the administrator.

Figure 30 - History of TCR
Also, TCR processes can be reactivated. In general, once a TCR is in the final state *Publication* or *Publication is without approval* its workflow process is finished. However, the issuing TCR creator is able to reactivate the TCR process (e.g. to make amendments). This will trigger a restart of the TCR workflow and also an automatic note (*Notes* tab) stating that the process has been reactivated.

- **Process**
  The exact path within the workflow a TCR has taken is visually depicted in a process image. Furthermore, by hovering over an icon the user is able to retrieve information when an action has been taken, started and finished and by whom.

The current process step is marked with a green dotted square.

Note: For privacy reasons, the name attribute is anonym and not be displayed to any role except for the administrator.

![Figure 31 - Process status detailed TCR](image-url)
1.7. **Export TCRs**

In a case that it is needed to export TCRs, users can use the “List of reports” function under "Reports" section on the left menu. Opening and executing the “Map report”, users will get the list of all TCRs. By clicking at the “Export Options” button on the top of the form, a form with the export options opens and it is possible to define a needed export format.

![Figure 32 - Export TCRs](image)

1.8. **Coordination and publication**

1.8.1. **The live cycle of TCRs as electronic workflow**

A TCR dataset will have different states during its lifecycle, which define the possible interactions with the dataset (in terms of role permissions and available functionalities) and to which other states it can transfer to.

A workflow engine depicts the business rules in order to handle a TCR over the complete time span of its lifecycle. In general, a distinction is made between the following types of TCRs:

- the inserted TCR affects no other IM, hence **no coordination process** for TCRs is triggered by the TCR-Tool
- the inserted TCR affects another IM and the **coordination process** between the involved IMs is automatically triggered by the TCR-Tool

Triggers for enabling the harmonisation process are when the system detects an affected IM within the importing or manual creating process of a TCR, an affected border or a deviation border or IM has been added to the TCR. For the sake of better clarity, a fully detailed version of the workflow,
which depicts RNE’s business rules for handling TCRs (involved responsible editors, states, process steps, etc.), can be found in Appendix 1.

The state of a TCR dataset changes automatically as part of the TCR processing or manually in the relevant process step by the responsible editor. The manual change can be performed within the TCR detail view or the TCR overview in list form. Furthermore, a batch processing function in the TCR overview in list form allows changing the state of multiple TCRs at once. The criteria that define the possible state changes for a TCR are derived from the roles concept and workflow rules as shown in the figure below.

![TCR state diagram](image.png)

**Figure 33 - TCR state diagram**

**Detailed description of the different TCR states**

- **First publication**
  The state of TCRs between the time span of x-24 months to <x-19 months is automatically set to *First publication*, where x represents the date of the annual time table change. These are TCRs, which have neither been coordinated internally nor with external IMs yet. To get an overview about TCRs in the state *First publication*, the Affected IMs, the issuing TCR-coordinator and RFC Coordinators can run reports about TCR in this state. The default dashboard includes reports about TCRs in the state *First publication* and Updates to TCRs in *First publication*.

- **Imported**
  A TCR has been successfully imported and its state is automatically set to *Imported*. The TCR remains editable for the TCR-Creator until the temporal threshold has fallen below x-19 months. Afterwards a validation routine determines if an IM is possibly affected by the TCR. If this is true, the TCR is subject to an automatically state change to *Submitted for review* and is forwarded to the TCR-Coordinator of the affected IM. If no IM is affected by the TCR, its state is changed automatically by the system to *Submitted for publication* and forwarded to the responsible RFC-Coordinator.

- **Draft**
  A TCR has successfully been created with the TCR-Creation form within the TCR-Tool and

---

1 The Date for the annual time table change can be configured on a global level. Please note, that in case the number of months (x-number of months) has to be changed, it will only by applied to new TCRs.
the state of the dataset is automatically set to *Draft*. The TCR remains editable for the TCR-Creator until the temporal threshold has fallen below x-19 months. Afterwards a validation routine determines if an IM is possibly affected by the. If this is true, the TCR is subject to an automatically state change to *Submitted for review* and is forwarded to the TCR-Coordinator of the affected IM. If no IM is affected by the TCR, its state is changed by the system to *Submitted for publication* and forwarded to the responsible RFC-Coordinator.

- **Submitted for review**
  If a coordination process for a TCR is necessary due to an affected IM, the system automatically changes the state of a TCR from *Imported or Draft* to *Submitted for review*. Thus, the TCR is forwarded to the TCR-Coordinator of the affected IM and is available for review in the respective role work list. The TCR-Coordinator has the option to agree (by setting the state of the TCR to *Approved*) or disagree (by setting the state of the TCR to *Not approved*) to a TCR.

- **Approved**
  A TCR approved by the TCR-Coordinator of the affected IM is available in the role work list of the responsible RFC-Coordinator in order to be reviewed.

- **Not approved**
  If the TCR-Coordinator of the affected IM does not agree to the TCR, the respective user is able to manually change the state of the TCR to *Not approved*. Subsequently the TCR is available in the work list of the initial creator of the TCR in order to be adapted. After saving and completing the adapted dataset, the system automatically checks, whether an IM is affected or not. In case of an affected IM, the TCR automatically changes its status to *Submitted for review* upon saving and completing the form. A TCR with no affected IM automatically changes to the state *Submitted for publication* to be reviewed by the responsible RFC-Coordinator. The TCR-Creator has adapted a not approved TCR. After submitting the TCR form the state of the TCR is automatically changed to *Submitted for review* by the system.

- **Publication without approval**
  This final state of a TCR is part of a coordination process and can be achieved in two separate ways:
  a) the TCR is implicitly accepted by the TCR-Coordinator of the affected IM if the review has not been executed until x-17 months or x-12 months
  b) the TCR is in the state *Not approved* and can be edited by the initial TCR-Creator until one week before publication. If the TCR has not been edited and the date is below one week prior the publication date the state is automatically set to *Publication without approval*.
  This state can only be changed according to the following cases:
  a) the TCR is cancelled by the initial TCR-creator
  b) the affected IM approves the TCR (*state changed to Publication*)
  c) the publication date has elapsed and TCRs can be modified by the issuing IM

- **Submitted for publication**
  After a TCR has been imported/created without an affected IM, the state of the TCR automatically changes from *Imported or Draft* to *Submitted for publication*. In this state, the TCR will be available for being reviewed in the role work list of the responsible RFC-Coordinator.

- **Reviewed**
  After the responsible RFC-Coordinator has given recommendations within the review cycle, the state of the TCR automatically changes from *Submitted for publication to Reviewed* and will be forwarded to the TCR-Creator and available as an unread item in the worklist.

- **Publication**
  The RFC-Coordinator can change the state of an approved or for publication submitted TCR into the state *Publication*, which is declared as a final state of a TCR. In addition, the state *Publication* will be set by the system to all *Approved* and *Submitted for publication*.
TCRs when the deadline for publication is reached without review by the RFC-Coordinator. This state can only be changed according to the following cases:
   a) the TCR is cancelled by the initial TCR-creator
   b) the TCR is modified by initial TCR-creator

- **Modifying a TCR**
  If a TCR is in one of its final states (*Publication* or *Publication without approval*) the responsible TCR-Creator is able to modify the respective dataset. A reactivation functionality is implemented allowing to modify the TCR until the very beginning of the TCR. Upon the editing has been completed, the system automatically sets the status of the TCR to “Modified” and the process cycle accordingly follows the workflow. The figure below shows the state diagram for modifying TCRs.

![Figure 34 - Detailed diagram for the Modified state](image)

- **Cancelling a TCR**
  The initial TCR-Creator is able to cancel a TCR during its whole lifecycle as shown in the figure below. A dataset of a cancelled TCR will remain as read only. In case that a TCR cancelled by the TCR-Creator while the TCR is in the “Company To-Do’s” list of another user, a warning dialog is presented to the TCR-Creator. This dialog contains information with regards to the currently processing user and the TCR-Creator must confirm the message. If the TCR was in the “My To-Do’s” list of a specific user other than the TCR-Creator, an E-mail will be sent to the respective user, with the information, that a TCR in the “My To-Do’s” list has been cancelled.
Figure 35 - Detailed diagram for the Cancelled state

Note on modifying and cancelling TCRs: Once a TCR has already been approved (in the course of the coordination process between the two involved IMs) and will be modified or cancelled afterwards, the TCR-Coordinator of the affected IM is automatically being notified via E-mail about the modification/cancelation.

1.8.2. Bulk editing of TCRs

When importing TCRs via the .xml or xls interface it may be necessary to to assess multiple TCRs at once by using a bulk processing function to reduce the number of clicks significantly.

The following steps describe the function:

1.) Open the “Processed & Released” in the “Company To-Do’s” menu by selecting the respective navigation point in the navigation menu.
2.) Select the TCRs by pressing Ctrl/Strg (label depends on the layout) key on the keyboard and click on the entries (do not open the TCRs). The TCRs are selected.
3.) Click on the “Take” button in the “Additional functions tab” (on the top of a form). The two selected TCRs have been moved from the “Company To-Do’s” to the “My To-Do’s” of the user. The user’s “Company To-Do’s” is opened.
4.) Verify the presentation of the selected and taken TCRs. The two TCRs are selected.
5.) Check that the TCRs task values are “Approve TCR”
6.) Check the presentation of the “Bulk Edit” button in the “Additional functions” tab. The button is enabled.
7.) Click on the “Bulk Edit” button. A dialog window is opened allowing the user to select the following states for the selected TCRs by using radio buttons:
   - Approved
   - Not approved (preselected)
1.8.3. Involve IMs into the coordination

There are three possible ways to involve IMs into a coordination process:

1.) A TCR affects a border – a TCR is directly touching or go through the border line. In this case, a coordination process starts automatically.

2.) Manually added TCR – while manually create a TCR, in case of necessity, IMs could be involved in a coordination process by adding a needed IM. To add an IM to coordination process, the “+” button (marked red) should be clicked and a new record with a list of all IMs is shown. During TCR creation, the status near to “Affected IM” will be, by default, set to “Open” and disabled. A user who has the application right to create TCRs is able to manually select 1..n affecting IMs. Once the coordination starts, IM will be able to change the status.

3.) Imported TCRs – a user who has the application right to import TCRs is able to manually define 1..n affecting IMs in the Excel-Sheet by indicating the UIC-Code of the respective IM. To define IMs that will be involved, the “International coordination” column will be used in...
the Excel file by indicating the respective UIC-Code of the IM/s. The given values must be separated with a comma. After the respective TCR7s has/have been imported, the given affected IM/s is/are via the Excel file displayed in the “Affected IM” field of the TCR detail view.

Figure 38 - Indication of international coordination for TCRs

1.8.4. Assessing of TCRs

To assess TCRs following steps are necessary:

1.) In case a coordination process was initiated the affected IM receives the respective TCR in the “Assessment” list “Company To-Do’s” menu (red marked-1)

2.) Now the IM user has to take responsibility and select the TCR and transfer in his “My To-Do’s” list by clicking on the “Take” button (red marked-3)

3.) Now the TCR has to be open in the “Assessment” list in the “My To-Do’s” menu. Click on respective TCR and open details. A new task bar is visible “Assess TCR” (red marked – 2). Click on “Assess TCR”. A window is shown were the IM user can

- Approve
- Not approve
- And add comments
4.) Select your choice and comment. Finish with clicking on “Save and complete”. The assessment step is completed. In case the TCR was approved it will further follow the workflow (Info for TCR coordinator, Publication). In case it was not approved it will be handed back to the issuing IM.

The following pictures show different views of the status of an approved TCR.

![Figure 39 - Workflow status sheet](image_url)

![Figure 40 - History status sheet](image_url)

### 1.8.5. Cancelation of a TCR

To cancel TCRs following steps have to be processed (users are only able to cancel only TCRs of own IM if they have appropriate roles):

1.) Via the navigation menu selects the “Show/Search TCRs”. The TCR overview is opened in the “List view” form.
2.) Open the detail view for the TCR to be cancelled by double-clicking on the respective entry in the list.
3.) Click on the “History” tab. The “History” tab is opened.
4.) Check that the button “Cancel TCR” is displayed. The respective buttons are enabled.
5.) Click on the “Cancel” button. A warning message is shown (Message depend on status of TCR to be cancelled)

6.) Confirm the message by clicking on “OK”. The TCR detail view is refreshed

7.) In the “TCR details” tab check the status of the TCR. The status of the TCR is “Cancelled”.

![Figure 41 - Cancelling a TCR](image)

1.9. Reporting and notification

The TCR-Tool provides various types of reports for users in order to work as a comprehensive information source. Attributes (e.g. used in the TCR-form for manually creating TCRs) can be related to each other allowing for generating different reports. These reports can be freely configured by the Administrator allowing of meeting the user’s demands for individual TCR information. Users are able to run reports according to the rights of their role. Results for reports can be displayed in the output formats such as HTML table, Exports to Excel or PDF-exports. Furthermore, users can subscribe to these reports and define an interval, which shall be used for notifying in a periodic manner.

For instance, the Administrator can configure reports for

- number of updated TCRs (sum and average) in relation to the final publication
- number of coordination’s (sum and average) per RFC
- number of operating users (sum and average) per day/week/month
- number of TCRs (sum and average) per reason for restriction
- timespan (sum and average) per TCR for a specific section
- number of TCRs (sum and average) with a specific state
- timespan (sum and average) in which a TCR stays in a certain state

1.9.1. Notifications

1.9.1.1. Notify concerned partners about edited TCRs

The system automatically notifies affected IMs about edited TCRs, which have already been successfully coordinated between IMs.
1.9.1.2. Notify concerned partners about cancelled TCRs

The system automatically notifies affected IMs about cancelled TCRs, which have already been successfully coordinated between IMs.

1.9.1.3. Notify concerned RUs after publication

The system automatically notifies RUs and interested parties about notes added to a TCR if they are registered and assigned to the service.

1.9.1.4. Report subscription

Users can subscribe to pre-defined reports. The following steps show how a user can subscribe.

1.) Via the navigation menu select “Report Subscription”. The “Report Subscription” is opened.
2.) Click on “New”. A new browser window to configure a report subscription is opened.
3.) Check the presentation of the browser window. The following fields are displayed:
   - a combo box to select a defined report
   - radio buttons to define the interval of the report sendings. The user is able to select the following intervals:
     - daily
     - weekly
     - monthly
     - Insert button
     - Cancel button
4.) Select the interval
5.) Select the report mentioned in the precondition from the combo box for “Report”.
6.) Click on the “Insert” button. The browser window has been closed and the selected report subscription is displayed with the according to schedule value in the “Report Subscription” list.
2. TCR Webtool V2.0- Technical Manual

2.1. Technical requirements

TCR tool is a web-based application and does not have any direct hardware requirements. The application can be used on many operating systems and with various web browsers.

For the best user experience, the TCR tool strongly recommends using a display with minimum screen resolution 1024*768 pixels or better. Recommended web browser is Chrome.

2.2. TCR master data management

The TCRs can be imported into TCR tool on two different ways: via Excel file or via XML file, what is already explained in chapter Error! Reference source not found.. Additionally, import via XML file can be done via manual XML import file (like excel import) or via a web-service. The XML structure will be validated on upload, and an appropriate status report is displayed. In addition, the import routine will validate if the user is authorised to create a new TCR (factoring in the provided transactional data) and if there are consistency issues with related master data. The import stores only data in the TCR tool, if no validation or consistency errors occur. In case of errors, the TCR tool responds with a detailed error report.

Descriptions of the excel and xml file structure (interface) are below.

2.3. Specification of .xls interface

The excel file used for importing TCRs needs to follow a predefined structure. The overview of this structure can be seen in Appendix 2 of this document.

The excel file to be imported must fulfil the following rules:
- The TCR are on the 2nd sheet
- The TCR definitions start from the 4th row

The columns in the Excel sheet must be used as defined below. Note that only columns relevant for the import are listed. The table has the following structure:
- Column – Column identifier in the Excel file
- Interpretation – Meaning of the column (form the Header row)
- Allowed type– The type of the column
- Constraints / Values – Rules that will be validated during the import and predefined values in the excel. Mandatory fields are marked with Not null.
- Mapping – The name of the field of the TCR form into which the value of the column will be mapped

<table>
<thead>
<tr>
<th>Column</th>
<th>Interpretation</th>
<th>Allowed type</th>
<th>Constraints / Values</th>
<th>Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>IM</td>
<td>Text</td>
<td>Not null; Value must match the name of an Organisation Units defined in the TCR-Tool</td>
<td>IM (Organisation Unit)</td>
</tr>
<tr>
<td>C</td>
<td>ID</td>
<td>Text</td>
<td>Not Null; The combination IM (column B) together with ID (column C) must be unique</td>
<td>Reference ID</td>
</tr>
<tr>
<td>D</td>
<td>Section</td>
<td>Text</td>
<td>Not Null; Value must match the section which is computed from the fields 'Location From' and 'Location To'</td>
<td>Not mapped</td>
</tr>
<tr>
<td>E</td>
<td>Direction</td>
<td>Text</td>
<td>Not null; Value must be in [&lt;, &gt;, &lt;=]</td>
<td>Direction</td>
</tr>
<tr>
<td>F</td>
<td>From Location</td>
<td>Text</td>
<td>Not Null; Value must match a Location stored in the TCR Tool topology data</td>
<td>Location from</td>
</tr>
<tr>
<td>Column</td>
<td>Description</td>
<td>Value Type</td>
<td>Validation Rules</td>
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<td></td>
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<tr>
<td>G</td>
<td>To Location</td>
<td>Text</td>
<td>if null, then the interpretation is that ‘To Location’ is the same as ‘From Location’ if not null, the value must match a Location stored in the TCR Tool topology data</td>
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<td>Time To</td>
<td>Time</td>
<td>Date/Time To</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Duration</td>
<td>Text</td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Time of day</td>
<td>Text</td>
<td>Type of TCR</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Reason of restriction</td>
<td>Text</td>
<td>Reason of restriction</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Total Closure</td>
<td>Text</td>
<td>Total Closure (true if value = T or X)</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Reduced Track Availability</td>
<td>Text</td>
<td>Reduced Track Availability LT (true if value in [LT, LT+ST]) Reduced Track Availability ST (true if value in [ST, LT+ST])</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>Speed Restrictions</td>
<td>Text</td>
<td>Speed Restrictions (true if value in [S, X])</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Weight, Length, Profile</td>
<td>Text</td>
<td>Weight (true if value in [W; W+L; W+P; W+L+P]) Length (true if value in [L; W+L; L+P; W+L+P]) Profile (true if value in [P; W+P; L+P; W+L+P])</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Diesel only</td>
<td>Text</td>
<td>Diesel only (true if value = Do or X)</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Cancellation</td>
<td>Text</td>
<td>Cancellation Freight trains (true if value in [C, X])</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>Re-routing</td>
<td>Text</td>
<td>Re-routing Freight trains (true if value = R)</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>Train replacement</td>
<td>Text</td>
<td>Train replacement Freight trains (true if value = B or X)</td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>Delays</td>
<td>Text</td>
<td>Estimated delays (true if value not null) Define delay minutes (if value represents a positive integer)</td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td>Other</td>
<td>Text</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td>Description</td>
<td>Text</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td>International coordination</td>
<td>Text</td>
<td>International coordination</td>
<td></td>
</tr>
<tr>
<td>AE</td>
<td>In yearly timetable</td>
<td>Text</td>
<td>In annual timetable (mapping TBD: proposal to change allowed values to [Y] or [Y; N])</td>
<td></td>
</tr>
<tr>
<td>AF</td>
<td>IM project ID</td>
<td>Text</td>
<td>IM Project ID</td>
<td></td>
</tr>
<tr>
<td>AG</td>
<td>Last update</td>
<td>Datetime</td>
<td>Data status</td>
<td></td>
</tr>
<tr>
<td>AH</td>
<td>Cancelled</td>
<td>Text</td>
<td>If value = Y, the TCR will be cancelled</td>
<td></td>
</tr>
</tbody>
</table>
2.4. Specification of .xml interface

The overview of the .XML structure can be seen in Appendix C of this document.
Annex A – Workflow without an RFC Coordinator
### Annex B - Structure of Excel file

<table>
<thead>
<tr>
<th>RM</th>
<th>ID</th>
<th>Section</th>
<th>Direction</th>
<th>Line</th>
<th>Year</th>
<th>Week</th>
<th>Period from</th>
<th>Period to</th>
<th>Duration</th>
<th>Time of day</th>
<th>Reason for restriction</th>
<th>Traffic Impact</th>
<th>Traffic measures</th>
<th>Description</th>
<th>International co-ordination</th>
<th>IMI Project ID (Optional)</th>
<th>Last update</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H)</td>
<td>2311462</td>
<td>Brennero - Varena</td>
<td>P to S</td>
<td>BRENNERO - VITTIEGO</td>
<td>2017</td>
<td>12</td>
<td>4/1/2017</td>
<td>10/31/2017</td>
<td>periodic</td>
<td>Switch</td>
<td>T</td>
<td>D</td>
<td>Greensund Bridge</td>
<td></td>
<td></td>
<td>6/1/2017</td>
<td></td>
</tr>
<tr>
<td>(H)</td>
<td>2311462</td>
<td>Brennero - Varena</td>
<td>P to S</td>
<td>FRAZO-TREZ</td>
<td>2017</td>
<td>12</td>
<td>4/1/2017</td>
<td>10/31/2017</td>
<td>periodic</td>
<td>Train &amp; Rail</td>
<td>T</td>
<td>LT</td>
<td>Closed to freight trains</td>
<td>Y</td>
<td></td>
<td>Refer to other phase</td>
<td>6/1/2017</td>
</tr>
</tbody>
</table>
Annex C – XML structure

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
xmlns="http://rne.com/schemas/TCR"
targetNamespace="http://rne.com/schemas/TCR"
xmns:xs="http://www.w3.org/2001/XMLSchema"
xmns:taf="http://www.era.europa.eu/schemes/TAFTSI/5.2"
elementFormDefault="qualified">
  <xs:import namespace="http://www.era.europa.eu/schemes/TAFTSI/5.2"
schemaLocation="TAF/taf_cat_complete.xsd"/>
  <xs:element name="TCRMessage">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="taf:MessageHeader"/>
        <xs:element ref="taf:AdministrativeContactInformation"/>
        <xs:element ref="taf:Identifiers"/>
        <xs:element name="TCR" type="TCRType" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:element name="ReasonForRestriction">
    <xs:complexType>
      <xs:restriction base="taf:IdentCode">
        <xs:enumeration value="10"/> <!-- Signal -->
        <xs:enumeration value="20"/> <!-- Switch -->
        <xs:enumeration value="30"/> <!-- Catenary -->
        <xs:enumeration value="40"/> <!-- Track & Rail -->
        <xs:enumeration value="50"/> <!-- Tunnel -->
        <xs:enumeration value="60"/> <!-- Bridge -->
        <xs:enumeration value="70"/> <!-- Miscellaneous -->
        <xs:enumeration value="80"/> <!-- Maintenance -->
      </xs:restriction>
    </xs:complexType>
  </xs:element>
  <xs:element name="Description" type="xs:string" minOccurs="0"/>
  <xs:element ref="taf:StartLocation"/>
  <xs:element name="Direction">
    <xs:complexType>
      <xs:restriction base="taf:IdentCode">
        <xs:enumeration value="10"/> <!-- <> -->
        <xs:enumeration value="20"/> <!-- < -->
        <xs:enumeration value="30"/> <!-- > -->
      </xs:restriction>
    </xs:complexType>
  </xs:element>
  <xs:element name="TemporalExpansion" type="TemporalExpansionType"/>
  <xs:element name="OperationalConsequences" type="OperationalConsequencesType"/>
  <xs:element name="ProjectID" type="xs:string" minOccurs="0"/>
  <xs:element name="Status">
    <xs:complexType>
      <xs:restriction base="taf:IdentCode">
        <xs:enumeration value="10"/> <!-- Imported -->
        <xs:enumeration value="15"/> <!-- Draft -->
        <xs:enumeration value="20"/> <!-- Submitted for review -->
        <xs:enumeration value="25"/> <!-- Approved -->
      </xs:restriction>
    </xs:complexType>
  </xs:element>
</xs:schema>
<xs:element name="End" type="xs:dateTime"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="RoughDurationType">
  <xs:sequence>
    <xs:element name="StartYear" type="xs:gYear"/>
    <xs:element name="StartWeek" type="WeekType"/>
    <xs:element name="EndYear" type="xs:gYear"/>
    <xs:element name="EndWeek" type="WeekType"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="WeekType">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1"/>
    <xs:maxInclusive value="52"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="PercentageType">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="100"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="WorkingDaysType">
  <xs:attribute name="monday" type="xs:boolean"/>
  <xs:attribute name="tuesday" type="xs:boolean"/>
  <xs:attribute name="wednesday" type="xs:boolean"/>
  <xs:attribute name="thursday" type="xs:boolean"/>
  <xs:attribute name="friday" type="xs:boolean"/>
  <xs:attribute name="saturday" type="xs:boolean"/>
  <xs:attribute name="sunday" type="xs:boolean"/>
</xs:complexType>
<xs:complexType name="OperationalConsequencesType">
  <xs:sequence>
    <xs:element name="ReducedTrackAvailability" minOccurs="0">
      <xs:complexType>
        <xs:attribute name="LT" type="xs:boolean"/>
        <xs:attribute name="ST" type="xs:boolean"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="DimensionalRestriction" minOccurs="0">
      <xs:complexType>
        <xs:attribute name="weigth" type="xs:boolean"/>
        <xs:attribute name="lenth" type="xs:boolean"/>
        <xs:attribute name="profile" type="xs:boolean"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="TotalClosure" type="xs:boolean" minOccurs="0"/>
    <xs:element name="SpeedRestriction" type="xs:boolean" minOccurs="0"/>
    <xs:element name="DieselOnly" type="xs:boolean" minOccurs="0"/>
    <xs:element name="AffectedTrafficVolume" type="PercentageType" minOccurs="0"/>
    <xs:element name="Classification">
      <xs:simpleType>
        <xs:restriction base="taf:IdentCode">
          <xs:enumeration value="10"/> <!-- Minor -->
          <xs:enumeration value="20"/> <!-- Medium -->
          <xs:enumeration value="30"/> <!-- Major -->
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:element name="TrafficMeasures" type="TrafficMeasuresType" minOccurs="0"/>
<xs:element name="DeviationLocations" type="DeviationLocationsType" minOccurs="0"/>
<xs:element name="DeviationBorders" type="DeviationBordersType" minOccurs="0"/>
<xs:element name="DeviationComment" type="xs:string" minOccurs="0"/>
<xs:element name="InternationalCoordinationComment" type="xs:string" minOccurs="0"/>
<xs:element name="InYearlyTimetable" type="xs:boolean"/>
<xs:element name="IndicationOfTimetableAdaption" type="xs:date" minOccurs="0"/>
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</xs:complexType>
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<xs:element name="ReRouting" type="TrainTypeType" minOccurs="0"/>
<xs:element name="Replacement" type="TrainTypeType" minOccurs="0"/>
<xs:element name="Delay" type="TrainTypeType" minOccurs="0"/>
<xs:element name="EstimatedDelay" type="DelayType" minOccurs="0"/>
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</xs:complexType>
<xs:complexType name="TrainTypeType">
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<xs:attribute name="longDistance" type="xs:boolean" use="optional"/>
<xs:attribute name="shortDistance" type="xs:boolean" use="optional"/>
<xs:attribute name="commuter" type="xs:boolean" use="optional"/>
</xs:complexType>
<xs:complexType name="DelayType">
<xs:attribute name="freight" type="xs:positiveInteger" use="optional"/>
<xs:attribute name="longDistance" type="xs:positiveInteger" use="optional"/>
<xs:attribute name="shortDistance" type="xs:positiveInteger" use="optional"/>
<xs:attribute name="commuter" type="xs:positiveInteger" use="optional"/>
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<xs:element name="DeviationLocation" type="taf:LocationIdent" minOccurs="1" maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
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</xs:complexType>
</xs:schema>