How to keep trains running on Europe's Infrastructure

A Comprehensive Guide on How to Improve TCR Management

By Matteo Soldini and Sebastian Naundorf

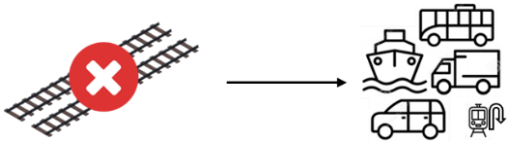
With Europe's ageing rail infrastructure finally receiving significant funding for renewal, the planning of construction works – called Temporary Capacity Restrictions (TCRs) in railway terminology – and the planning of the affected trains are considered *the* crucial topic for the next decade. When discussed in general media, TCRs are often considered a main cause for delays, although with the right framework they effectively could be planned and integrated into reliable timetables.
This article tries to provide a comprehensive overview about measures that, if taken up, can improve the reliability of trains while the European Network is modernized to meet the Green Deal ambitions. This covers measures both within the sector and by stakeholders outside the sector.

TCRs are needed

Whereas TCRs are an inconvenience for all users of rail infrastructure, the whole sector considers them to be crucial. Most parts of Europe's rail networks have suffered from underfunding over several decades, leaving them in a state where Infrastructure Managers could provide the necessary safety levels, but the robustness of a reliable timetable and the capacity increases demanded by the market could not be offered. With most European politicians now recognizing this backlog, billions of Euros are finally made available for infrastructure improvements – be this for maintenance, re-constructing or building new infrastructure. With a positive long-term perspective, the short and medium perspective is devastating: trains are rerouted, slowed down severely or even cancelled, leading to uncertainty for customers both in the freight and passenger markets facing uncertainty as to whether they can rely on their booked trains.

TCRs may be executed with different effects on train service:

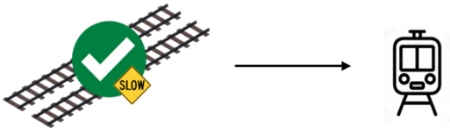
- Full closures: this method tends to be the one with the lowest costs for the Infrastructure Managers (IMs) due to less safety requirements, less changeover times, and easier logistics. This may come with fast improvements, if work is executed 24/7; but also comes with the risk of capacity waste if



the line is closed 24/7 but with actual work only being done in daytime shifts so as to minimise costs – leading to trains being cancelled throughout the closure period. This method tends to be also the most expensive option for Railway Undertakings (RUs), as they have often high costs for alternative routes or services. In the worst case - in the event of long closures - customers could permanently switch to a different transport mode.

- Partial closure, where at least one track remains open for traffic throughout the day, or if works are limited to specific parts of the day. With some trains being able to still run, the impact on transport can be much lower. With this method the costs for the IM are higher and the costs for RUs are lower compared to a full closure.

- Speed restrictions during the works, with very limited impact on traffic, but usually also only minor improvements to the infrastructure are possible.



It's a case-by-case decision that should be made in dialogue between IMs and affected RUs as to which of the approaches are most appropriate. Whereas in the past often the available budget of the IM dictated the approach, it is important to move quickly towards a holistic approach which reflect the overall business needs and alternatives.
Factors impacting such decisions shall involve the type of traffic affected and its ease for alternatives to be put in place: can goods be re-routed with limited extra costs? Can passengers be re-routed with limited extra time? Can substitute-transport be provided with limited extra time and sufficient capacity? There are no simple solutions, e.g., for regional transport, a long-time myth considered that "regional passengers can always use a bus instead". This is less and less realistic, considering the number of buses and drivers needed to bring commuters to work (the recent "Riedbahn-closure" in Germany alone requires 150 buses) – let alone the prolonged travel time and reduced comfort pushing users back to car travel. Similarly, freight cannot be simply re-routed. Besides extra transport times, most re-routing lines have different characteristics, requiring the need for extra rolling stock, shorter trains, additional staff training, and as a result much higher costs compared to competing modes.

To sum up, TCRs are necessary, but need to

- Be predictable for traffic users.
- Make an adequate trade-off between impact on traffic and pace of improvement.

What can be done by the sector (RUs, IMs)

Clearly, the sector needs to plan ahead – to common timelines and with common processes. A TCR identified well in advance can be better coordinated and alternatives can be investigated. This is supported with the Timetable Redesign TTR approach of early timetabling, also taken up in the European Commission's proposal for a new rail capacity

management regulation, and needs further improvements in processes, tools and execution at sector level.
With 50% of the freight traffic in Europe being cross border, and the market potential for cross-border passenger traffic not yet fully realised, international harmonization of processes is essential. It may even provide more alternatives, when cross-border cooperation by IMs for re-routing is severely improved.
As a key requirement, RUs need early and reliable information in the long term. Thus, they can at best provide the customers a realistic offer before ordering – which means in the best case already including modified timings in the annual timetable. If TCR effects are planned later, the second best is that a train is replanned only once, and well in advance of the day of operation. FTE's members consider six months as a reasonable timeline allowing traffic to adapt – although it might take some time to reach that goal, step-by-step.
Example of good practice are available, such as the closure of the Upper-Rhine-Valley in 2024, where the IM started involving the RUs already in 2022 and even involved neighbour IMs to identify additional rerouting.
Most other current practices are not yet fulfilling the need of a reliable plannability well ahead. Instead, trains are replanned several times often only a few weeks or even only days before the train runs. However, when discussing process improvements, a common argument is that framework factors outside the sector need to be adapted.

What can be done by the wider stakeholders – Ministries, Politicians, the general public?

National Governments and European Institutions can support the sector by improving numerous frameworks that clarify available funding, contracting rules, public planning, availability of resources, re-routing options and the legal framework.

1. Financing Sources and Timelines

The sector, and thus the IMs, need simple and early clarity about available funding for TCRs.

To achieve that, national governments should:

- Provide a stable financial framework for railway maintenance and improvements, with several years being forecast (ideally 5 years)
- Provide enough funding for capacity-friendly TCRs – meaning not "the cheapest" but "the optimum for work and traffic".
- Align application timelines for different funding sources – if different funding pots are used, the IM should know the attributed budgets at the same time.
- Coordinate financing timelines with neighbouring countries to improve cross-border harmonisation.

If all funding is provided at the same time with some years forecast, the IMs will be able to plan well ahead.
If funding is provided at an early stage, the IM is able to plan TCRs timely to get in a dialogue with the affected RUs. Only one (re-)planning step is necessary, and freight and passenger customers can be informed well in advance.

2. Tendering processes

IMs are usually bound to public procurement rules when selecting TCR contractors. Such rules may require the IM to tender according to inappropriate timelines when considering the effects on reliable train planning. They may even include rules that do not allow a dialogue between IMs and RUs about the best possible TCR execution - reflecting construction possibilities.

National governments should:

- Create a framework for IMs to tender contracts based on suitable timelines.
- Create a framework for IMs, RUs, and contractors to have a common iteration process to find the best solution.
- Create such frameworks that shall involve IMs, RUs and the construction sector.

As a goal, governments should adapt relevant regulations to allow all actors to find overall solutions including fitting to required timelines. That would allow IMs to tender construction needs and to moderate construction knowledge with Rus' traffic needs.
If tendering is optimized for partnership, predictability in rail infrastructure maintenance can increase.

3. Public planning and consultation rules

Depending on their nature, construction works can be subject to public consultation rules. The timelines and (un-)predictability can overlap and interfere with the timetabling processes, making it less reliable.

National governments should:

- Integrate planning, public consultation and other processes into overall timelines
- Combine and simplify the public planning and consultation timelines with financial planning and tendering
- Ideally align these improvements with neighbouring states to facilitate cross-border planning
- And ideally align other government goals or PSO targets with common processes and timelines (e.g. when to decide to reduce travel times with tilt technology, CO2 goals with electrification, etc)

With aligned planning and consultation rules, the backlog of works could be reduced, and the combination of planning and works can be made easier and more reliable.

4. Availability of contractors and resources

The construction sector has limited resources to carry out rail works, which are largely dominated by orders from state or near-state buyers. The resources – especially knowledge - need to be built up and will not increase if *ad hoc* funding is made available. To prevent delays and backlogged works, governments and the rail sector need to work with a long term vision.

National governments can engage in long term works planning. By this they can

- Provide predictability for contractors – what expertise will be required and what volumes can be expected in the rail construction sector in the future?
- Give support in terms of materials – modern technology requires specific resources not easily available on the world market. Governments can set priories for these for rail.

With national governments providing funding and stable outlooks, IMs can then reliably forecast TCRs and inform the construction sector as part of an ongoing process. With the construction sector made aware of long-term business opportunities, experts and resources can then be organized for sound TCR execution – and ultimately less impact on RUs.
Note that also the authorities and IMs need skilled staff, so providing long term reliability will make it more likely for all of them to build up the necessary expertise.

5. Availability of alternative rerouting

Rail traffic needs to flow. With more and more lines being heavily used or congested, the availability of capacity due to TCRs is often dramatically reduced.

Some traffic could be re-routed, but today most networks don't offer suitable alternatives – even if routes are in theory available, they may be built to a lower standard, requiring for example trains to be shortened, or axle-loads to be reduced.

National governments can ensure:

- Planning for alternative routes being part of all processes, also in the long term before a line closure becomes imminent.
- Creation of alternative routes should be a precondition for IM funding.
- Adequate funding for alternatives – focussing on more than the core network
- Allow higher spend to allow re-routing lines to be at same standards as the core network (possible train weights, lengths, safety systems, overhead wires…)
- Coordination with neighbours – some rerouting possibilities may be just behind the border – mutual support will help both sides
- Interoperability with alternative routes included in long-term investments
- Support in the provision of buses or other non-rail solutions if needed

When alternative routes (replacement concepts on rail) are planned and implemented well in advance, the negative impact of TCRs on traffic can be dramatically reduced.

6. Legal Framework for capacity management

Today's legal frameworks for rail infrastructure capacity management are mostly national. From a sector perspective, national rules are not sufficient – even when the general approaches follow European Directives, the details may be crucially different.
National governments should support necessary revisions of EU legislation towards clear and unified pan-European sector rules. The European Commission has made a first step when proposing a new Regulation on Rail Infrastructure Capacity Management. This should be finalized soon and pave the way for further common rules on TCR handling.

Governments should support that such European Rules cover:

- The procedures for the planning of capacity between IMs and between IMs and RUs
- Clear deadlines for when TCRs must be considered stable
- Important process steps including the planning of the traffic solutions affected by TCRs
- Deadlines by which time re-planned paths are needed

- Escalation bodies and procedures

A Regulation should facilitate and push for aligned, harmonized sector internal rules, and thus end the inconsistent implementation of current EU law, and by this improve TCR planning both across borders and nationally.

Reliable trains are possible if the frameworks are right

Providing reliable, good quality rail services to passengers and freight needs efforts from RUs and IMs, working to suitable frameworks set by Europe and the Member States.

Member States can improve these frameworks by

- Improving financing itself as well as financing timelines
- Improving tendering processes for construction works
- Improving and aligning public consultation rules for construction works
- Creating long-term perspectives also for the contractor sector
- Ensuring the provision of suitable rerouting alternatives in the case of major capacity restrictions
- Supporting the sector in EU legislative revision

Instead of being “cheapest for IM” it would turn to “optimal for the sector”.
Member States, the EU and the Sector together can make a change for better rail transport. The FTE community looks forward to supporting the improvements to TCRs in 2024 and beyond!

This article is based on a presentation by FTE for the IRP initiative and to contribute to discussions and is not an official position of FTE members.

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