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Current challenges in the authorisation of on track machines

PROSE WHITE PAPER

Author:
Stefan Bühler

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Vehicle authorisations are challenging and involve risks.

This applies in particular to the authorisation of on track machines.

PROSE has already been able to support several procurers and manufacturers in the field of authorisation.

The authorisation of on track machines faces new challenges arising from the revision of the Technical Specification for Interoperability (TSI LOC&PAS) in 2023. This article examines the changed framework conditions and the resulting difficulties, particularly in relation to the national and multinational authorisation of vehicles. The current situation in Switzerland is also considered.

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AUTHORISATION OF ON TRACK MACHINES

1 Situation regarding the 2023 revision of the TSI LOC&PAS

2 Situation in Switzerland, including border sections

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5 Recommended actions for:
- Procurers in Europe (excluding Switzerland)
- Procurers in Switzerland
- Manufacturers
- Authorities

With the revision of the Technical Specification for Interoperability for locomotives and passenger vehicles (TSI LOC&PAS[1]) in 2023, several framework conditions for on track machines have also changed significantly.

1 SITUATION REGARDING THE 2023 REVISION OF THE TSI LOC&PAS

Until now, authorisations could be obtained either under national regulations[2] or in accordance with the requirements of the TSI LOC&PAS. The requirements for on track machines set out in the TSI LOC&PAS partly differ from those formulated for locomotives and passenger vehicles.

For authorisations of on track machines in a single country, the revised 2023 TSI LOC&PAS still allows the choice of obtaining them either under national regulations or under the TSI LOC&PAS[3]. For multinational authorisation, however, authorisation must be obtained in accordance with the TSI LOC&PAS (see TSI LOC&PAS point 7.1.1.3, item (1)).

At first glance this seems logical. On closer inspection, however, difficulties become apparent, both in authorisations within Europe and in Switzerland. The impact of this requirement is considerably greater than it may initially appear.

The following outlines the key aspects of an authorisation under national regulations (simplified process shown in Figure 1):

- In most European countries, this is based on the EN 14033[4] series of standards (fulfilled in Switzerland).
- In some countries, applications are submitted via the ERA[5] OSS[6], while in others they are submitted directly to the authority (CH: directly to the authority BAV[7]).
- This authorisation covers all operating modes of the vehicle (fulfilled in Switzerland).
- Assessments are sometimes carried out in analogy to TSI authorisation processes by designated bodies (DeBo[8]); in other cases, the authorities examine the evidence themselves (CH: examines the evidence itself, although in some cases this evidence must first be evaluated by an expert report submitted in advance).

Terminology

Often, the English term 'OTM' (On-Track Machines) is used. However, in the revised TSI it remains a subgroup of 'special vehicles', as shown by the wording 'special vehicles, such as On-Track Machines (OTMs)'.

These allocations are not always identical. In some cases, road-rail vehicles are also included under this term, in others not. For rescue vehicles, for example, recovery cranes are clearly classified in this category according to the TSI LOC&PAS. For fire and rescue trains, which are also intended to evacuate passengers, the classification is not entirely clear.

To avoid excessive complexity, in this article the term "on track machines" is used to cover all of the above vehicle categories, with the exception of road-rail vehicles and rescue vehicles that may also carry passengers.

on track machines can almost always be operated in different modes, for example:
Possible modes of operation:

- Driving mode
- Working mode
- Transfer mode

In driving mode (often also referred to as "transfer mode"):

- With or without own propulsion
- Manned or unmanned (always refers to staff, never passengers)
- With or without driver's cab
- With or without train protection system

Working mode:

- With own propulsion, without own propulsion, or with propulsion that is only active in working mode
- With or without driver's cab
- With or without active train protection system
- With or without exceeding the vehicle clearance gauge
- And many more

Transfer mode:

- The vehicle may be in the state of working mode, with the restriction that all parts must remain within the vehicle clearance gauge.
- Accordingly, this condition may be the same as the working mode, differ slightly, or differ substantially. For example, vehicles which can only be operated on closed tracks in working mode may, for transfer runs, interact with track vacancy detection systems (shunting movement) or even be operated with train protection systems (train movement).

Not all modes need to be present; however, many on track machines have several working modes.

For the sake of consistency, the term 'authorisation' is used throughout this article. Various terms such as "authorisation for placing into service/placing on the market", "authorisation for placing into service" or "operating permit" do not always cover exactly the same scope, but are all understood here under the single term "authorisation".

[1] "TSI LOC&PAS 2023", Commission Regulation (EU) No 1302/2014 of 18 November 2014 on a technical specification for interoperability relating to the 'rolling stock — locomotives and passenger carriages' subsystem of the rail system in the European Union, (consolidated version), ERA, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014R1302-20230928 (accessed 7 January 2025).

[2] The national regulations for on track machines are all based on the EN 14033 series of standards (see also footnote 4). Manufacturers of on track machines had already established this standard at an early stage in order to be able to supply vehicles as uniformly as possible to all markets. As a result, these national requirements for on track machines are highly standardised, and the provocative question of what the added value of a TSI certification for on track machines actually is may be raised.

[3] This always means: in accordance with the requirements of the TSI LOC&PAS for special vehicles and the associated NNTR of the states concerned.

[4] EN 14033-1, -2 and -3 "Railway applications – Track – Railbound construction and maintenance machines", CEN, current edition 2017.

[5] European Union Agency for Railways (formerly European Railway Agency).

[6] One-stop-shop (OSS): ERA web portal for the submission of authorisation applications.

[7] Federal Office of Transport (FOT), supervisory and authorisation authority in Switzerland.

[8] Dedicated Body, responsible for the assessment of national requirements, i.e. those set out in the NNTR of the state concerned. Scope of application: the respective state.

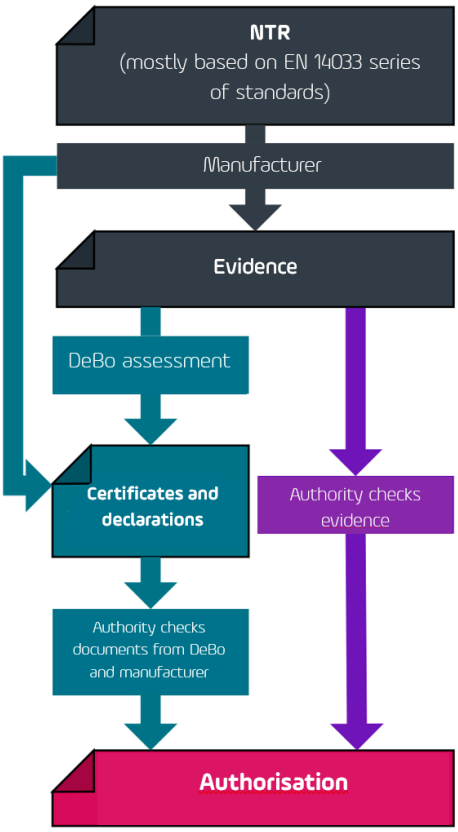

Figure 1: Process of national authorisation of on track machines (simplified, graphic by the author)
Purple: The authority examines the evidence directly. This is the approach taken, for example, by the FOT in Switzerland. In some special areas, the manufacturer must additionally submit reports from independent experts.
Green: Path in analogy to TSI processes, with substantive assessment by a DeBo, as applied for example by the EBA in Germany

- Stepwise processes, with the possibility of preliminary consultations with the authorities in the early project phases (for example, regarding the authorisability of solutions or the appropriate form of evidence), are common practice and often valued by both sides (fulfilled in Switzerland).
- Standards are treated as standards and not as laws (see also chapter "Situation regarding regulations and authorities"). This means that innovative approaches can also be authorised, provided that equivalent safety[9] can be demonstrated (fulfilled in Switzerland).
- Vehicles of categories 6 and 7 according to EN 14033, see Figure 3 (self-propelled also in driving mode, but not incorporable into a train), can be authorised (fulfilled in Switzerland).
- In some states, additional work permits from the infrastructure manager on whose infrastructure the on track machine is intended to operate are still required (CH: depending on the vehicle and its application).

Key points of an authorisation under TSI LOC&PAS (simplified process shown in Figure 2):

- Firstly, the requirements for special vehicles in the TSI LOC&PAS are relevant (these often differ from the requirements that the same TSI sets for locomotives and passenger vehicles).
- Secondly, the National Notified Technical Rules (NNTR) of the states in which the vehicle is to be authorised must be fulfilled.
- Applications are submitted via the ERA OSS.
- The TSI requirements concern only the driving mode.
- Authorisations for working and transfer modes must be obtained in separate processes. In some states, the documents for these modes are also submitted via the ERA OSS, in others a separate process must be carried out with the national safety authority.
- In some states, the verification of these requirements is handed over entirely to infrastructure managers.
- Preliminary clarifications are only possible to a limited extent. In formal "pre-engagement" processes[10], the authorisation authorities (ERA and national authorities) confirm only the requirements (which may then also be fixed for a limited period[11]). In the less formal, though not legally binding, process of "chargeable services", further issues can also be discussed with these bodies in order to identify appropriate directions[12].
- The authorisation application must be submitted in full via the OSS. The content of the documents is only reviewed after a completeness check.
- The assessment of evidence is carried out by assessment bodies such as the "Notified Body" (NoBo[13]) for TSI requirements, the DeBo for NNTR requirements, and the "Assessment Body" (AsBo[14]) for the evaluation of safety-related requirements and of the requirements identification process.
- The standards referenced in the TSIs are elevated to the level of law (see Chapter 3 "Situation regarding regulations and authorities"). The acceptance of alternative evidence or evidence of equivalent safety for divergent implementation of requirements through assessment by an AsBo is in principle possible. Unfortunately, this often remains only theoretical. Experience shows that the risk of non-acceptance is high, obtaining prior authorisation from the authorities for the intended approach is lengthy, and the authorisations are of only limited reliability.
- Vehicles of categories 6 and 7 according to EN 14033 (see Figure 3, centre) cannot be authorised under the TSI LOC&PAS; however, these vehicles are usually not deployed internationally.
- For vehicles based on freight wagons, the evidence used for certification under the TSI for freight wagons (TSI WAG) can only be utilised if the requirements of the TSI LOC&PAS for on track machines and those of the TSI WAG are identical, and if the evidence is complete[15].
- In some states, additional work permits from the infrastructure manager on whose infrastructure the on track machine is to be used are required.

This overview shows that it is not only two different sets of regulations that define different requirements, but that one is also operating in two different worlds with divergent processes and responsibilities.

[9] Also includes compatibility and availability, not only safety in the strict sense.
[10] See https://www.era.europa.eu/domains/applicants/applications-vehicle-type-authorisations_en (accessed 3 February 2025).
[11] A project-specific regulatory status may be agreed. If a standard is renewed after the date of such agreement, authorisation may still be granted under the agreed version of the standard.
[12] For example, the acceptance of demonstration methods.
[13] "Notified Body" responsible for the assessment of European requirements, i.e. those formulated in the TSIs. Scope: EU + EFTA states.
[14] "Assessment Body" primarily assesses risk analyses.
[15] For example, this is not the case with driving dynamics. Freight wagons are exempt from tests if proven standard solutions are implemented. However, the TSI LOC&PAS requires evidence according to EN 14363 and other standards, and does not provide for simplifications such as those in the TSI WAG for freight wagons.

Furthermore, up to now practically all states have formulated the requirements for on track machines as national rules (National Technical Rules, NTR; as opposed to NNTR, Notified National Technical Rules), mostly based on the EN 14033 series of standards. However, NNTR requirements for on track machines, in addition to an assessment under TSI LOC&PAS, have hardly been developed in any state. The players in the sector – not only the legislators – did not have the amendment of the TSI, which for multinational authorisations requires mandatory demonstration in accordance with TSI + NNTR, nor its consequences, on their radar and are therefore unprepared.

The German NNTR for on track machines to be authorised under TSI + NNTR were published in the RDD on 25 March 2025.[16] In most other states, work has not yet even begun, meaning that an authorisation under TSI + NNTR, as required for on track machines to be deployed multinationally, is simply not possible today.

In addition, Germany has decided to adjust responsibilities under these new regulations. For authorisation processes under both national rules and TSI + NNTR, it is intended that the EBA will in future be responsible only for the driving mode and for those issues of the working and transfer modes that relate to normal railway operations (for example, ensuring that a service vehicle cannot unintentionally leave a closed track section, or opposing track locks for on track machines which exceed the clearance gauge while working). For all other issues in working and transfer modes, responsibility is to rest with the infrastructure manager.

The concrete implementation is not yet known. However, given the wide range of possible operating states (see box "Terminology"), it is evident that this division of responsibilities will vary dynamically depending on the type of service vehicle. Furthermore, infrastructure managers were in the past indeed able to accept on track machines. The sovereign part of this task, however, was transferred to the authorities in recent years. As a result, infrastructure managers currently lack both the structures and the necessary staff to take on this task, which would now be assigned to them practically without preparation time.

Corresponding discussions are also taking place in other states. In Switzerland, issues of occupational safety have been delegated to SUVA.[17] However, since they lack the necessary expertise in certain railway-specific areas, some infrastructure managers have, for several years, required an additional work permit for specific types of on track machines from a body designated by the infrastructure manager.

At present, what is common to almost all states is that the requirements set and verified by infrastructure managers are not yet clearly formulated. Moreover, the processes themselves are also unclear and often still under development.

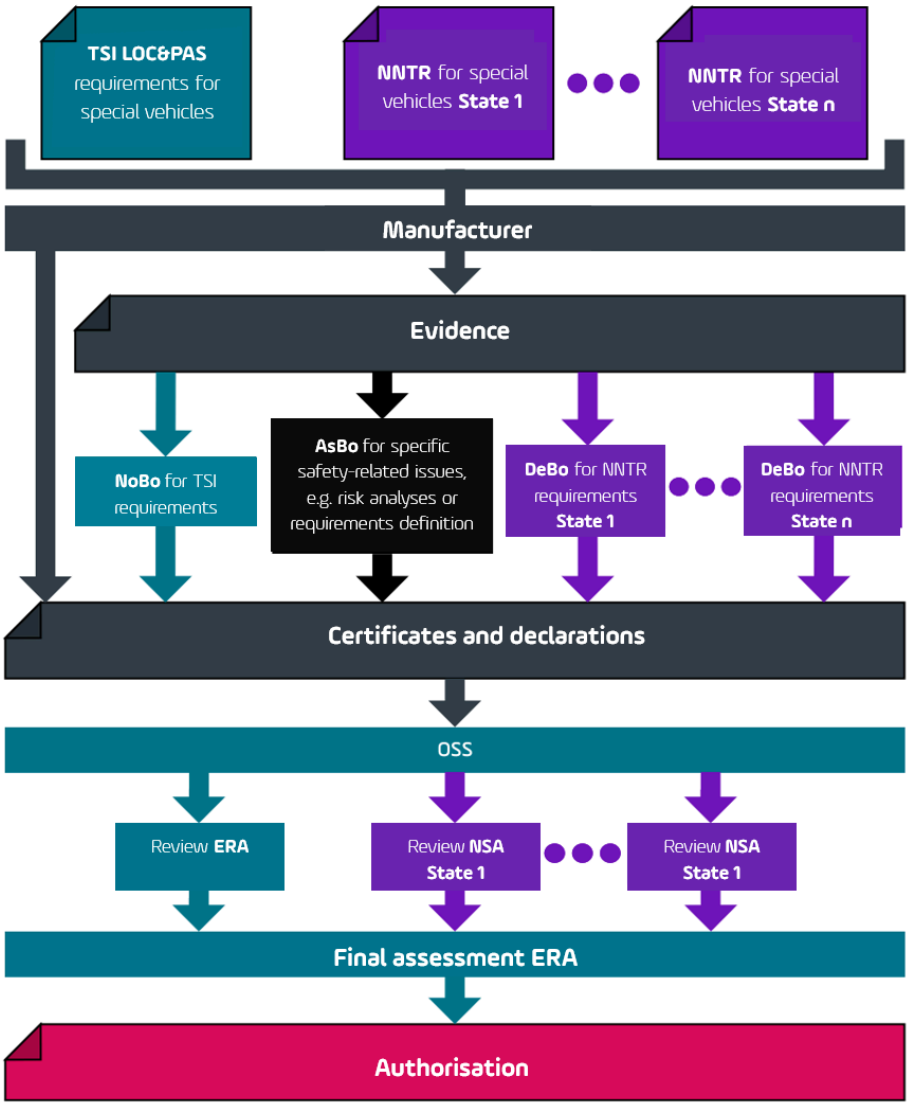

Figure 2: Process of multinational authorisation of on track machines (simplified, graphic by the author)

Construction train with MTW by Plasser & Theurer, operated by Furrer+Frey (Photo: Furrer+Frey)

[16] Reference Document Database: https://rdd.era.europa.eu/rdd/
[17] Swiss National Accident Insurance, formerly "Swiss Accident Insurance Fund".

Another issue has arisen with the 2023 revision of the TSI LOC&PAS. Section 7.1.4 of the TSI LOC&PAS describes how the area of use of a vehicle can be extended. It is often the case that a service vehicle already in operation in one country is to be authorised in another country for a larger project.

For vehicles already authorised under TSI + NNTR, the process is relatively straightforward: only the NNTR for the target country need to be demonstrated. However, since hardly any on track machines have yet been authorised under the TSI LOC&PAS (how could they, when the prerequisites are not yet in place?), this situation is unlikely to become relevant for a few years.

For vehicles authorised under the old Interoperability Directive 2008/57/EC[18] (replaced by the currently valid Interoperability Directive 2016/797[19]) or before 19 July 2010, simplified methods exist by which an authorisation can be extended to another country. It must be explicitly noted that the definition 'authorisations under the old Interoperability Directive 2008/57/EC' covers not only authorisations under the TSIs valid at the time, but for on track machines also those granted under the then applicable national rules.

In general, the provisions described in Section 7.1.4 of the TSI LOC&PAS for extending authorisations to additional countries are quite practical. They also allow, for example, proof of compatibility through comparison of the infrastructure characteristics of the networks in the new countries with those of the countries where authorisation has already been granted. For vehicles that operate only on closed tracks and are transferred in driving mode like a freight wagon, this evidence is often easy to provide. Nevertheless, supplementary national requirements for the target country may also need to be fulfilled.

Table 1 — Machine categories depending on maximum operating speed

		Self-propelled machine Speed *v*		Non-self-propelled machine [b]
		≥ 100km/h	< 100km/h	
Adjustable train formation [a] with a speed of:	*v* ≥ 100km/h	Category 1	Category 2	Category 3
	v < 100km/h	-	Category 4	Category 5
Not adjustable in train formation		-	Category 6	Category 7

a For these machines, restrictions may apply regarding their position in the train formation.

b These types of machines may only have self-propelled functions in shunting and working modes.

Figure 3: Categorisation of on track machines (Source: Table 1 of EN 14033-1:2017, published in SN EN 14033-1 by SNV, Swiss Association for Standardisation, Winterthur; categories 1 to 5 can be authorised either nationally (under the EN 14033 series of standards) or multinationally under the TSI LOC&PAS. Categories 6 and 7 are covered only by the EN 14033 series of standards and therefore cannot be authorised multinationally).

High-performance track renewal train for substructure rehabilitation in shift intervals, PUSCAL S, developed and manufactured by Scheuchzer AG and operated by Scheuchzer AG (Photo: Scheuchzer AG)

[18] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0057 (accessed on 7 February 2025)
[19] https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=uriserv%3AOJ.L_.2016.138.01.0044.01.DEU ((accessed on 7 February 2025)

For vehicles authorised under the current Interoperability Directive 2016/797 in one country under national rules and later to be authorised in another country, no provisions have yet been formulated. Either a separate national process must be carried out in the target country, or the authorisation is then treated as a multinational authorisation, requiring a process under TSI + NNTR requirements. This can be critical, particularly in the quite normal situation where, at the time of the initial national authorisation, different rules applied and certain characteristics were authorised through alternative solutions using evidence of equivalent safety. Some examples illustrating this can be found in the box on the right.

Even once NNTR for on track machines are eventually formulated, and thus the mandatory path of a TSI + NNTR authorisation for on track machines intended for multinational use becomes possible, it must be noted:

- Since purely national authorisations under the EN 14033 series of standards are already largely harmonised in terms of requirements, the obligation for TSI + NNTR authorisations for on track machines leads to uncertainty due to changes in responsibilities and requirements, which are likely to persist for years.
- Furthermore, innovative solutions and those deviating from standards are in practice no longer eligible for authorisation – a major problem for both manufacturers and users of on track machines!
- In contrast, the benefit for on track machines is evident only in very few special cases, for example for simple, fully standard-compliant on track machines intended for operation in several countries.

Examples of requirements without benefit:

Example 1

In a service vehicle, staff are also to be transported in driving mode to and from the worksite. Accordingly, a toilet with washbasin as well as a small kitchenette with coffee machine and kettle are foreseen.

The toilet and washbasin are to be supplied with utility water from a tank. Drinking water supply is to be provided by bottled water.

The revised TSI LOC&PAS of 2023 requires in section 4.2.5.1:

"The materials used for the on-board storage and distribution of water to sanitary systems (e.g. tanks, pumps, pipes, taps and seals and their quality) shall comply with the requirements applicable to water intended for human consumption in accordance with Directive (EU) 2020/2184 of the European Parliament and of the Council."

Even though this is phrased in a very convoluted way in Directive (EU) 2020/2184, it sets requirements for drinking water. The above passage therefore demands the installation of a drinking water supply system*.

However, according to the operator's concept, use of a drinking water system is not intended. If it were used with drinking water, significantly higher maintenance costs would have to be expected (even if bottled water could then be dispensed with).

This requirement therefore generates costs without any benefit.

Example 2

A non-powered service vehicle is also to transport staff in driving mode to and from the worksite. For this purpose, the service vehicle is to be incorporated into a construction train.

A company instruction is foreseen requiring, before departure, a connection check with shunting radio to the locomotive staff as well as a check of the emergency brake function when triggered in the service vehicle.

The revised TSI LOC&PAS of 2023 sets out the following requirement in section 4.2.10.3.2:

"Equipment and areas in vehicles where there is an inherent fire risk shall be equipped with a system that detects fires at an early stage. After a fire has been detected, the driver shall be informed; in addition, appropriate automatic measures shall be taken to minimise the subsequent risk to passengers and staff."

This requirement is easily implementable and meaningful for multiple-unit trains. However, in the specific application of a service vehicle within a construction train hauled by any locomotive, with an arbitrary number and variety of vehicles between the said service vehicle and the locomotive, this requirement cannot be implemented at reasonable cost.

Implementation could only be achieved through drastic operational restrictions. For example, by requiring that the service vehicle must always be marshalled directly behind the locomotive and that the locomotives used must be equipped with a corresponding display system in the driver's cab. Only such specially equipped locomotives could then be used together with this service vehicle.

Such an approach would be extremely costly and would impose significant operational restrictions, whereas the solution foreseen through the planned operating instruction would ensure the required level of staff protection with little effort. Under the TSI, however, the proposed solution cannot be certified.

** According to the transitional provisions in Annex L of the TSI LOC&PAS, it is currently still possible to implement a solution in accordance with the previous version of the TSI (which also permits a utility water supply). This will no longer be possible once the transitional period expires.*

Snow blower Xrotm by SBB and Zaugg, operated by SBB (photo: Stefan Bühler)

2 SITUATION IN SWITZERLAND, INCLUDING BORDER SECTIONS

Before relations between Switzerland and the EU became strained following the failure of the first framework agreement, agreements existed with all neighbouring states concerning the mutual recognition of authorisations on cross-border sections (see also Figure 4).

Authorisations from neighbouring states are still accepted by Switzerland as the basis for authorisation on cross-border sections located on Swiss territory.

Vehicles already authorised on cross-border sections in countries bordering Switzerland retain this authorisation. In the Fourth Railway Package, the EU replaced all bilateral agreements on cross-border authorisations with a new European regulation. As a result of EU pressure on Switzerland, the land transport agreement between Switzerland and the EU could not be updated; this means that the old rules are no longer in force, and the new ones cannot be adopted.
The Federal Council has made the following statement on this situation[20]:

"In the present case, the issue concerns agreements on cross-border operational lines and not the land transport agreement between Switzerland and the EU, which continues to be observed by both contracting parties. Switzerland cannot at present fully adopt the Fourth Railway Package, as the necessary negotiations are blocked due to unresolved institutional questions. For this reason, from the EU's perspective, Switzerland is to be regarded as a third country in the context of cross-border operational lines, and the Member States are no longer permitted to apply the existing agreements on cross-border operational lines with Switzerland. These agreements must be adapted to the requirements of the Fourth EU Railway Package (technical pillar) or newly concluded. The FOT is in contact with the EU and with the neighbouring states in this regard. This process will take some time.
Until new agreements on cross-border operational lines are in place, railway undertakings must, in addition to the FOT authorisation, undergo an authorisation procedure with the European Union Agency for Railways (ERA) in order to operate on cross-border operational lines located abroad. The developments described with regard to the agreements on cross-border operational lines relate exclusively to rail transport and have no impact on road freight transport. Accordingly, the Federal Council does not intend to take measures in the field of road freight transport."

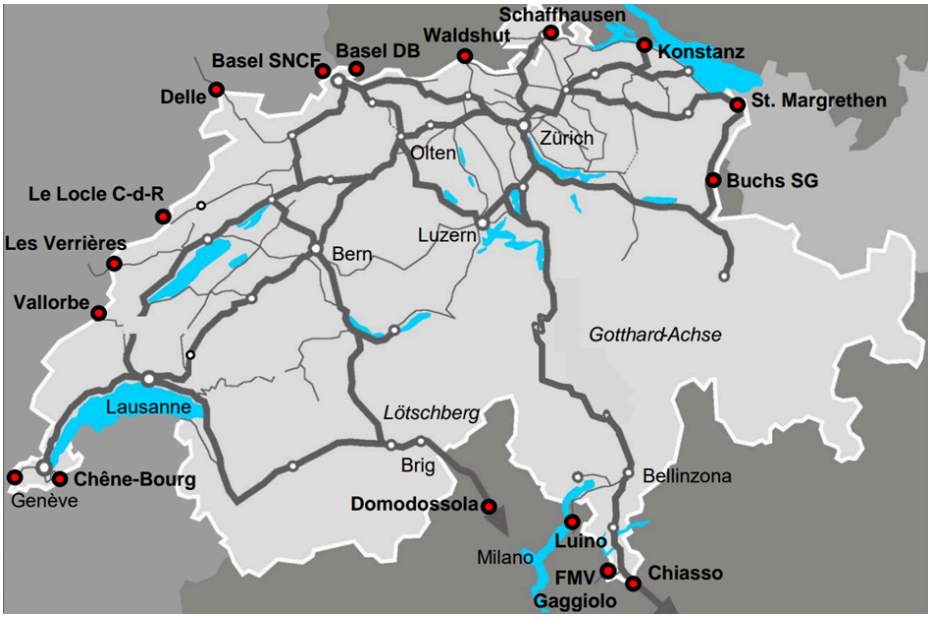

Figure 4: Border stations on the Swiss standard gauge network (Illustration: SBB Infrastructure)

For the current situation, a multinational authorisation is therefore recommended. For locomotives and multiple units, which must also be authorised in Switzerland under the TSI LOC&PAS, this is admittedly inconvenient, but the additional effort is limited.

For on track machines, however, this path is currently simply not feasible due to the situation outlined in the previous chapter. Accordingly, manufacturers of on track machines intended for use in Switzerland and on cross-border sections to neighbouring states must currently be advised to offer their on track machines only with a national Swiss authorisation, and to extend this to cross-border sections once the land transport agreement has been updated and the new EU cross-border agreements[21] also apply to the cross-border sections with Switzerland.

[20] Agreements on cross-border operational lines, Question Time in the National Council, reply of the Federal Council of 12 December 2022, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20228005 (accessed on 7 January 2025).
[21] See point (8) in Article 10 of Directive (EU) 2016/798.

In substantive terms, even under the new EU cross-border agreements, once they also apply to Switzerland, authorisations from neighbouring states may be used as the basis for authorisation on cross-border sections.

Convincing procurers in Switzerland that there is currently no economically viable solution for a legally secure authorisation of on track machines for Switzerland and the cross-border sections to neighbouring states is sometimes difficult, particularly because the impossibilities described above are not immediately apparent.

Interestingly, the cross-border sections to Germany are not affected by this issue. The German EBO[22] states in § 3a:
"On cross-border and transit lines, the corresponding regulations of the neighbouring state may be applied instead of the provisions of sections two to five, with the exception of § 11."

Since the EBO is German law and not an international agreement, its validity is not affected by any EU decisions. Applications for authorisations on cross-border sections located on German territory can therefore continue to be submitted to the German Federal Railway Authority, which will process them in accordance with the provisions of the EBO.

In addition, agreements at operational level between infrastructure managers have proven effective, as they often allow practical solutions. Naturally, however, there is no legal certainty as to the conclusion of such solutions.

The authorisation of on track machines in Switzerland is governed by the "Directive on the authorisation of railway vehicles"[23]. In essence, the requirements are based on the EN 14033 series of standards. Standards are treated as standards; in other words, alternative solutions are possible if it can be demonstrated that the required level of safety is achieved.

The processes are deliberately designed to be multi-stage and iterative. In a first step, an authorisation concept is submitted, which serves as a working document for both the FOT and the applicant to define and develop the authorisation process.

On the basis of the authorisation concept, the steps up to the granting of the operating permit can be agreed.

Depending on complexity, more or fewer intermediate steps are useful. In addition, the authorisability of innovative (or at least non-standardised) solutions can be examined, as well as the scope and type of evidence to be agreed. In particular, when combining elements from different standard domains (for example, implementing on track machines by means of containers or individual superstructures on freight wagons, or by integrating machine elements from industrial or construction applications) – a proven practice for on track machines – the acceptance of evidence based on standards from other sectors can also be verified.

All these steps greatly reduce the manufacturer's risk. After such preliminary clarifications, the manufacturer knows how to build the service vehicle so that it can be authorised, and what evidence[24] must be provided, and in what form, in order to obtain an operating permit.

That this procedure makes it possible to realise innovative on track machines tailored to specific tasks and conditions, with manageable risks, becomes almost self-evident when compared with the explanations in the preceding chapter."

"On track machines must be adaptable to their tasks. This requires regulations and processes that also enable innovation and adaptive solutions!"

Stefan Bühler
Senior Consultant, PROSE AG

CRANE KSW 1200 BY TECHNE KIROW, OPERATED BY RHOMBERG SERSA (PHOTO: RHOMBERG SERSA)

[22] Railway Construction and Operating Regulations (EBO), 8 May 1967, last amended by Article 2 of the Ordinance of 5 April 2019 (Federal Law Gazette I p. 479), https://www.gesetze-im-internet.de/ebo/EBO.pdf (accessed on 9 January 2025).
[23] See footnote 9.
[24] Conduct of tests, results of simulations, drawings, reports, risk assessments or other supporting documents.

3 SITUATION REGARDING REGULATIONS AND AUTHORITIES

Law instead of standard

Examples of standard requirements that can lead to unsolvable situations if they are elevated to the status of law:

- Signal lights at one end of a vehicle that must be positioned a few centimetres lower than required by the standard in order to allow the lifting platform located at that end of the vehicle to rotate without restriction.
- Solutions with new energy sources, which are often not yet covered by the standards, are also frequently affected.
- In the case of freight wagons, standards very often describe specific solutions (fortunately, this is not the case for on track machines). As a result, alternative solutions such as different types of articulated or short couplings for multiple wagons, on-board power supply, new transhipment technologies and many more are not eligible for authorisation across Europe.

In the EU "Blue Guide"[25] on the implementation of product rules, the role of standards is described in section 1.1.3:
"For products manufactured in accordance with harmonised standards, it is presumed that they comply with the relevant essential requirements of the applicable legislation. The application of harmonised or other standards remains voluntary, and manufacturers are always free to use other technical specifications to meet the requirements (however, it is for them to demonstrate that these technical specifications comply with the essential requirements)."

The "essential requirements" referred to in this quotation, sometimes also called 'fundamental requirements', have been defined for the railway sector as follows[26]:

- Safety
- Reliability and availability
- Health protection
- Environmental protection
- Technical compatibility
- Accessibility

If the manufacturer demonstrates that a solution has been implemented as described in a standard of the EN 14033 series or in referenced standards, both he and the authority may assume that the solution is also compliant with the 'essential requirements' and that these 'essential requirements' are fulfilled.

However, he is free to implement alternative solutions, but in such cases must himself provide the evidence of compliance with the above-mentioned "essential requirements".

When standards are referenced in regulations at the level of law, such as the TSI LOC&PAS, they are elevated to the status of law. This means that only the solutions described in the standard are then permissible.

Standards were fundamentally not developed for this purpose and are therefore hardly suitable to be used as legal texts.

The author is not aware of how this is handled in other product sectors whose products must also be assessed for conformity with the essential requirements under the "New Approach" according to the 'Blue Guide'. In the railway sector, however, standards are extensively cited directly in the TSIs, thereby becoming law. It would be more appropriate – and in line with the intention of the "Blue Guide" – to list them simply as harmonised standards. In that case, standards could also be applied as standards in TSI authorisations.

An overview of which regulations are treated as standards in which processes, and as laws in which processes, is shown in Figure 5.
It is clear that this "laws instead of standards" approach inhibits any innovation. Only solutions already documented in standards can be implemented with low risk.

There are ways in which alternative solutions could be brought to authorisation. A process for innovative approaches is described in Article 10 of the TSI LOC&PAS. In this case, the European Commission ultimately decides, on the basis of an ERA opinion, whether the solution should be supported. It is obvious that such a process cannot motivate any manufacturer to pursue it: there is no legal certainty of success, and the risks, time required and costs are unknown.

In principle, alternative solutions or methods of demonstration could also be analysed through the definition of risk acceptance criteria and a risk assessment. This analysis could then be evaluated by an AsBo. However, the authorities are very reluctant to accept this path and quickly refer to the above-mentioned process under Article 10 of the TSI LOC&PAS. Moreover, such an approach would first have to be agreed with the ERA and possibly also with the national authorities involved. The willingness of the ERA and many national authorities to take responsibility in such cases and to accept alternative solutions or demonstration methods is very low.

Streckenstopfmaschine DS09-4X und Planiermaschine USP-1 (im Hintergrund), Plasser&Theurer, betrieben durch Rhomberg Sersa (Foto Rhomberg Sersa)

[25] Guide on the implementation of EU product rules 2022 ("Blue Guide"), 2022/C 247/01, European Commission, https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:52022XC0629(04) (aufgerufen am 9. Januar 2025)
[26] https://www.era.europa.eu/domains/technical-specifications-interoperability_en (aufgerufen am 7. Februar 2025)

This situation is reinforced by the trend that the ERA and a large proportion of national authorities are increasingly focusing on the correct handling of processes. The background to this trend is that conformity assessment bodies are only permitted to assess whether an implementation is compliant with the requirements. In the case of deviations, they may only state non-compliance, but not assess whether the implementation or its evidence achieves the protection objective behind the requirement just as well as the solution described in the standard.

If the ERA and the national authorities only need to check the applicant's documents for completeness and verify whether the conformity assessment bodies have confirmed compliance for all requirements, then what is needed for the handling of authorisation procedures are process administrators rather than railway specialists. If, in the daily handling of processes at the ERA and at the national authorities, railway specialists are, from their perspective, no longer necessary, it is hardly surprising that expertise within the authorities is declining. Expertise cannot be maintained if it is not required, and ultimately it cannot be retained if it is not regularly applied.

It is therefore not surprising that the authorities are increasingly unable to engage in technical discussions on the handling of innovations, alternative solutions or alternative methods of demonstration, and even less willing to take decisions on such matters.

The current efforts of the Swiss Federal Office of Transport to counter this trend and to continue carrying out technical assessments also by authority staff must therefore be explicitly commended. This enables expert discussions with applicants on innovations, alternative solutions or alternative methods of demonstration. This capability is crucial for the further development of the railway system. Of course, this is now only possible in those vehicle categories that are not subject to mandatory authorisation under European requirements, such as road, narrow-gauge and rack railways, as well as the main subject of this paper: on track machines. However, since this still represents a significant volume, a certain degree of know-how retention is ensured.

Such efforts are also visible in Germany. Certain vehicle categories, such as tram-trains and road-rail vehicles, are authorised in purely national procedures in accordance with § 32 of the EBO. In such procedures, the applicant's evidence is assessed by experts who may also evaluate deviations from requirements. Finally, the applicant's evidence and the expert reports are reviewed by the EBA. In the case of national authorisations of track construction machines, the processes are closely aligned with the European procedures, and a DeBo assesses compliance with the requirements.

Furthermore, at the end of January 2025, a Memorandum of Understanding (MoU) was adopted between the EBA and relevant stakeholders in the German rail sector on the application of NNTR[27]. The MoU explicitly mentions the possibility of not fulfilling NNTR requirements literally, but instead demonstrating compliance with the underlying protection objectives through evidence of equivalent safety. As a result, the NNTR requirements in Germany (for all vehicle categories) are effectively downgraded to the level of standards, which at least in this area once again enables pragmatic solutions and innovation. It can be assumed that the MoU may also be applied mutatis mutandis to national authorisation processes for on track machines.

	National authorisation		**Multinational authorisation**
	Example Switzerland	Example Germany	
Laws	Railway law (EBG, SR 742.101) Railway regulation (EBV, SR 742.141.1) Implementing Provisions to the EBV (AB-EBV, SR 742.141.11)	General Railway Law (AEG) Railway Construction and Operating Regulations (EBO) Railway commissioning authorization regulations (EIGV) NTV list for track construction machines Standards referenced in the NTV list (e.g. majority of the EN 14033 series) ...	Interoperability Directive EU 2016/797 TSI LOC&PAS EU 1302/2014 with last amendment EU 2023/1694 Standards referenced in the TSIs ...
Standards	EN 14033 series of standards Other standards	Standard parts of the EN 14033 series not referenced in the NTV list Other standards	Harmonised standards (see Implementing Decision EU 2023/2584)

Figure 5: Status of requirements for on track machines (graphic by the author)
Note: With the MoU adopted at the end of January 2025, it was agreed in Germany between the EBA and other sector stakeholders that NNTR (for all vehicle categories) are to be treated as standards; i.e. that alternative solutions supported by evidence of equivalent safety may also be authorised. It can therefore be expected that NTV requirements for national authorisations of track construction machines (a term used in Germany, understood here as synonymous with the term service vehicle used in Switzerland) will also be treated as standards in the future.

[27] MoU – Application of Notified National Technical Rules for railway vehicles, EBA, 30 January 2025, https://www.eba.bund.de/SharedDocs/Downloads/DE/Fahrzeuge/Inbetriebnahme/W_IBG/MoU/01_MoU_ueber_die_Anwendung_der_notifizierten_nationalen_technischen_Vorschriften_NNTV_im_Rahmen_von_Genehmigungsverfahren_fuer_Eisenbahnfahrzeuge_einschliesslich_Anlage_Modulpruefung.html?nn=1985126 (accessed on 3 February 2025)

4 CONCLSUION

2023 revision of the TSI LOC&PAS

In relation to the 2023 revision of the TSI LOC&PAS, the authorities have not done their homework. Introducing requirements such as the obligation for authorisation under TSI + NNTR for multinational authorisations of on track machines without transitional provisions, even though the prerequisites for implementation are not yet in place, is unprofessional.

It must, however, also be noted that the authorities probably did not grasp the full implications of this requirement, and that the other stakeholders in the sector did not expect any change to the rules concerning on track machines and were caught off guard by the established facts.

Authorisation in Switzerland and for cross-border sections to neighbouring states

The concept of authorising vehicles for the time being in Switzerland and in neighbouring states does not work for on track machines, as multinational authorisations of on track machines must be carried out under TSI + NNTR, and the prerequisites for this are not yet in place.

It is therefore recommended that on track machines be authorised at present only in Switzerland under national requirements.

For the cross-border sections to Germany, a solution exists under German law. For the other neighbouring states, it is recommended to seek agreements at working level with the neighbouring infrastructure managers.

Once the EU–Switzerland relationship has been clarified (in whatever form), it can be assumed that mutual recognition of existing authorisations from neighbouring states for operation on cross-border sections will again be sufficient.

Status of regulations and administrative practices of the authorities

For the further development of the railway sector, the ability to introduce innovations is of fundamental importance. This possibility is, however, increasingly disappearing in Europe under the trends currently observed, both in areas governed by TSIs and in those governed by NNTR.

- Standards are elevated to the level of law through their reference in TSIs or NNTR.
- Conformity assessment bodies are only permitted to assess compliance with requirements as either ‘compliant’ or ‘non-compliant’.
- Authorities check only for completeness and process.

Some authorities are increasingly conducting authorisation procedures only with process administrators. As these administrators merely have to review the documentation from assessment bodies, technical expertise is no longer considered necessary. This results in hardly any innovation being possible for the large-scale vehicle types such as multiple units, locomotives, passenger coaches and freight wagons. The rule-based requirements defined there, and to be applied without flexibility, effectively prevent innovation.

National authorisations of on track machines and the processes still available in some states for non-TSI-compliant vehicles allow innovative solutions also to be authorised for on track machines and special vehicle categories. At the same time, they enable authorities (where they are willing) to retain technical expertise. This expertise allows them to conduct risk-based assessments – a fundamental prerequisite for the further development of the railway system.

Rail grinding train Grizzly 103 by Scheuchzer, operated by Scheuchzer (Photo: Stefan Bühler)

5 RECOMMENDED ACTIONS

Recommendation for procurers in Europe (excluding Switzerland):

- As long as states have not defined NNTR for on track machines under the TSI LOC&PAS, no vehicles with TSI + NNTR authorisation should be tendered in such states.
- It is therefore recommended to require only a national authorisation.

Recommendation for procurers in Switzerland:

- The recommendation of the Federal Council to procure vehicles with full TSI + NNTR authorisations for operation on cross-border sections abroad is not practicable for on track machines.
- It is therefore recommended to require only a national authorisation in Switzerland in the tender.
- If authorisation is also required for the foreign sections of cross-border lines, this currently entails very high risks for the manufacturer. These risks will either be priced into the offer, or, if the manufacturer does not recognise them, will endanger the implementation of the project.
- Authorisation for cross-border lines in Germany can be applied for at the German Federal Railway Authority. For other cross-border lines, agreements may possibly be reached with the infrastructure managers of the foreign sections.
- Once the EU–Switzerland relationship has been clarified, it can be assumed that the situation regarding cross-border lines will also be resolved.

Recommendation for manufacturers:

- Do not pursue TSI + NNTR authorisations for marketing reasons – the risks are currently too high.
- Clarify precisely what is feasible with low risk (normally these are national authorisations).
- Exclude everything else for the time being.
- Reassess once NNTR for on track machines under the TSI LOC&PAS have been defined and responsibilities for the working mode have been clarified.

Recommendation for authorities (ERA and national supervisory authorities):

- The authorisation of on track machines is already largely harmonised under national rules. Accordingly, applicants should again be given the choice between national authorisation procedures or procedures under TSI + NNTR for multinational vehicle authorisations.
- Amendment of the TSI LOC&PAS so that on track machines of categories 6 and 7 (according to EN 14033-1) can also be authorised under TSI + NNTR.
- Implementation of the process for extending the area of use of on track machines authorised under national requirements in accordance with the Fourth Railway Package.
- Removal of direct references to standards in the TSIs; standards should only be listed in the registers of harmonised standards related to the TSIs.
- Definition of NNTR for on track machines under the TSI.
- Clarification of responsibilities for the authorisation of machines in working mode.

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