Market consultation
Future proof rail grinding in the Netherlands

TN587642

ProRail Asset Management

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Introduction

Dear reader,

Welcome to the ProRail market consultation for futureproof rail grinding in the Netherlands.

ProRail is responsible for the Dutch railway network, which is of great importance for mobility in the Netherlands. Our employees ensure, 24/7, that 1,200,000 passengers and 100,000 tons of goods will reach their destinations every day, with 6,550 trains on over 7,000 kilometers of track and 6000 turnouts.
ProRail allocates capacity on the network, executes train traffic control, builds and manage stations, and maintains and renew the infrastructure. ProRail Asset Management is the division responsible for the maintenance of all existing infrastructure. Rail grinding is an important activity within the division and the coordination of this network covering maintenance is centrally managed.

In our previous market consultation (TN453858, 2024) we learned that some major changes require a system jump towards new generation grinding trains, new to build or to be retrofitted.
Hence, this market consultation precedes a tender for a new grinding contract for which those new generation grinding trains must be introduced to meet our specifications. When answering, keep the following principles in mind:

- Our intended grinding contract relates to network-covering rail grinding, to be performed with grinding trains during track closures;
- Our intended grinding contract will allow a level of certainty for mobilization period: the timespan between awarding the contract and the actual start of execution, in which at least engineering and construction of new generation grinding trains must be realized. This will be discussed in chapter 9;
- Our intended grinding contract will allow a level of certainty to the amount of work to be executed during a certain contract period. This will also be discussed in chapter 9;
- Milling is out of scope of this market consultation.

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Additional information provided by ProRail

In addition to this document, we will provide all participants with additional information upon request. We aim to inform you in such a way that your understanding of our demands increases.

[1] Scope and planning (PDF)
- This slide deck provides insight into how grinding in our intended contract will be organized, including an insight into differentiation in mutual responsibilities.

[2] Cyclic grinding orders (MS Excel)
- This file contains all cyclic grinding orders for 2027. In 2027, we implement a new cyclic grinding regime with associated intervals. This means that any datasets before 2027 are not representative. With today's knowledge, we assume that our new cyclic grinding regime will be in operation in a future grinding contract. Hence, this is the most accurate dataset for cyclic grinding we can provide.
- Metal removal is minimal 0,2 mm in tangent track including objects and minimal 0,3 mm in curves (label Slijpboog) and tunnels.
- Keep in mind that that this an annual amount of cyclic orders, and that the amount of cyclic shifts per year will be less as orders will be combined whilst composing cyclic shifts.

[3] Corrective grinding orders (MS Excel)
- This file contains corrective grinding orders that are representative for an average contract year, with several lengths and with a certain geographical distribution over our network.
- Metal removal is specified per order and is obviously higher compared with the cyclic grinding orders.
- Keep in mind that this is an annual volume of corrective orders, and that the amount of corrective grinding shifts per year depends on spatial distribution and the possibility of combining orders into corrective shifts.

[4] RLN00065-2 V003 (PDF)
- This document outlines our new grinding policy and delivery requirements. With today's knowledge, the technical specifications in the new grinding contract will be aligned with this document.
- The formal release of this new RLN is scheduled for Q2-Q3 2026. We will at least provide the draft version and when possible the published version.

[5] Transversal rail head profiles (PDF)
- This catalogue provides insight into transverse rail head profiles to be present in our network. The document differentiates to tangent track and curves.
- We provide this catalogue to make sure that any participant is able to make a trade-off regarding machine concepts and grinding speeds within the requirements as set out in RLN00065-2 V003.

[6] Transversal drawings from objects (PDF)
- This set of drawings provides insight into constraints when it comes to grinding along rail related objects.
- We will provide at least drawings from: level crossings, bridges, insulation joints, axle counters and other deviant constructions.

[7] RLN00065-1 V007 (PDF)
- This document pertains to the execution and delivery of grinding work on switches and crossings.

[8] Switch drawings (PDF)
- This set of drawings provides insight into switches and crossing constructions.
- We provide two separate sets of drawings with respect to discussions about switch types in Chapter 2.

[9] ERTMS planning (PDF)
- This document provides a timeline for ERTMS implementation on our network.

[10] Depot catalogue (PDF)
- This document contains information about our depots which are distributed across our network. We provide this information since it is mandatory to use these depots for any (daily) servicing activities.

The above-mentioned documents are all indicative. Obviously, information to be provided in a future tender will be valid for that contract.

TenderNed as single point of contact

As we chose not to upload these files on TenderNed, all information will be shared upon request in the message module on TenderNed. During market consultation, we ask you to communicate via TenderNed whenever needed.

Your response and follow-up

We invite you to upload your written input in English or Dutch in the attached excel format in the message module on TenderNed. This format allows you to discuss additional topics and further questions on your own initiative.
ProRail might invite you for an individual follow-up meeting. ProRail will make a report of that meeting, to be approved by you. All your information and reporting about it will be confidential.

See matrix below for the timeline:

Event	Actor	Expected
Uploading written input to TenderNed	Participants	Latest 5th of June 2026
Individual follow-up meetings	ProRail + participants	Week 24 2026
Report individual meetings + approval	ProRail + participants	June 2026

Thank you in advance for your time. We look forward to learn a lot and to shape the future of rail grinding in the Netherlands together with you.

The ProRail team

André Gosens	Tender manager
Ton Pouw	Cost Engineer
Bart Schotsman	Technical engineer
Matthijs Doesburg	Project manager

1 General information

In this chapter we want to get to know you. As we imagine that a single respondent can be a combination of complementary companies, please explain which of those companies your answer applies to.

Q.1.1
In which countries do you perform rail grinding commissioned by a railway manager?

Q.1.2
What is your (estimated) annual grinding volume in these countries all together? Feel free to express this in for example turnover, the amount of grinding shifts or grinding trains being in operation.

Q.1.3
What is your knowledge and experience on rail grinding at level crossings, bridges, deviant constructions, tunnels and switches and turnouts?

Q.1.4
What is your knowledge and experience on designing, engineering and constructing new grinding trains or retrofitting existing grinding trains?

Q.1.5
What is your knowledge and experience on (European) homologation of new or retrofitted grinding trains?

Q.1.6
Are you certified to arrange and execute safety measures to work independently during a track closure on our railway network? Please explain.

Q.1.7
Are you certified to arrange and execute any transports on our railway network? Please explain.

2 Machine concepts

2.1 Introduction

Since the characteristics of our network might impact your proposed machine concepts, we want to know more about the several types of grinding trains.
The ProRail network is characterized by the high density of railway junctions connected by relatively short railway lines, compared to for example France or Germany. Railway junctions are increasingly being constructed with flying junctions where tracks are grade-separated. In addition, many level crossings and bridges in various sizes need to be ground.
As we have shared our grinding orders, we would like to understand which machine concepts you suggest being most efficient and cost-effective for our network.

In this chapter 'machine concepts' refers to variations in grinding trains and grinding technology itself, not to be confused with other aspects like for example power supply.

2.2 The impact of switch grinding

As we understand that our need for grinding of switches might have an impact on your suggested machine concept, we would like to explore the logic and efficiency of having switches in or out of scope of a future grinding contract.
Our current grinding policy for switches involves:

- Only relatively long switches with a turnout angle ratio of 1:18, 1:18,5, 1:20, 1:29, 1:34,7 and 1:39,1 are in scope of our grinding program. Shorter switches (1:9, 1:12 and 1:15) are out of scope. Therefore, we do grind about just 30 – 50 of those long switches per year;
- Switch grinding must be executed and delivered according to RLN00065-1 V007 (shared document). See figures on pages 73 t/m 75;
- Metal removal must be minimal 0,2 mm, according to the RLN00065-2 V003 (shared document and as well applicable for machine grinding switches);
- Switch grinding must be carried out in both travel directions, for which a switch must go around during a grinding shift. This means that switch grinding always demands a double track closure, whereas all other grinding orders (ballasted track, level crossings, bridges etc) will be ground in single track closures for most of the shifts.

<u>Scenario A: machine concepts respecting our current switch grinding policy</u>

Q.2.1
Which machine concept do you suggest when taking our cyclic grinding orders (shared document) and corrective grinding orders (shared document) into account, assuming that switches must be ground according to our current policy?

Q.2.2
Follow-up on Q.2.1: Please explain to which extent you would grind switches with your grinding train(s) and to which extent you would use additional equipment. Please add estimated production norms (minutes) for:

- Switch 1:18 in both travel directions
- Switch 1:29 in both travel directions

Q.2.3
Follow-up on Q.2.1: What is your view on including smaller switches in our grinding program? Please add estimated production norms (minutes) for:

- Switch 1:9 in both travel directions
- Switch 1:15 in both travel directions

Q.2.4
Follow-up on Q.2.1: Which opportunities do you identify to include current non ground switch-parts (see RLN00065-1 V007 pages 73 t/m 75) into switch grinding? And what would be the impact of this 'extended switch grinding' be on your estimated production norms?

Q.2.5
Follow-up on Q.2.1: What is the shortest length of ballasted track in between two objects (for example: a level crossing and a switch) on which you can achieve 0,2 mm metal removal with your machine concept in mind?

Q.2.6
Follow-up on Q.2.1: To what extent does your machine concept rely on the use of additional rail vehicles such as for example an external firefighting rail vehicle?

Q.2.7
Follow-up on Q.2.1: What is your average maximum 'spark time' per grinding shift assuming an average rail condition to be ground? Please differentiate if relevant.

Scenario B: machine concepts for having switches not in scope

Q.2.8
Which machine concept do you suggest when taking our cyclic grinding orders (shared document) and corrective grinding orders (shared document) into account, assuming that switches are not in scope of a future grinding contract?

Q.2.9
Follow-up on Q.2.8: Having this machine concept in mind, to what extent would it be possible to grind one travel direction of a switch, obviously the travel direction which is aligned with the connecting ballasted track and being in a single track closure?
If possible with this machine concept, please add estimated production norms (minutes) for:
- Switch 1:09 in one travel direction
- Switch 1:15 in one travel direction
- Switch 1:18 in one travel direction
- Switch 1:29 in one travel direction

Q.2.10
Follow-up on Q.2.8: What is the shortest length of ballasted track in between two objects (for example: a level crossing and a switch) on which you can achieve 0,2 mm metal removal with your machine concept in mind?

Q.2.11
Follow-up on Q.2.8: To what extent does your machine concept rely on the use of additional rail vehicles such as for example an external firefighting rail vehicle?

Q.2.12
Follow-up on Q.2.8: What is your average maximum 'spark time' per grinding shift assuming an average rail condition to be ground? Please differentiate if relevant.

2.3 Final questions in this chapter

Q.2.13
Which choice with respect to switch grinding and associated machine concepts would you suggest us to select and why?

Q.2.14
Do you agree with us that all regardless of scenario A or B all grinding trains should be able to execute both grinding (including vacuuming residues and measuring) and transportations in a track closure autonomously, without any external traction?

Q.2.15
If yes on Q.2.14: Do you agree with us that regardless of scenario A or B all grinding trains should have two working and transportation directions for maximum efficiency and flexibility in a track closure? Please explain.

Q.2.16
What is your knowledge and experience with single pass grinding? Is it reasonable to expect to achieve 0,2 mm metal removal on tangent tracks in one single pass combined with meeting the EN-13231-2:2020 on aspects like transversal profile improvement, roughness, blueing etcetera?
And to what extent does the feasibility of this depend on your machine concepts as discussed above?

3 Single track safety

3.1 Introduction

Grinding in the Netherlands must be executed in a track closure. To acquire track closures with sufficient time, most of all grinding shifts will be executed in single track closures.

But obviously, working in single track closures poses potential safety risks. In this chapter we want to explore how to mitigate those risks and increase safety.

3.2 Activities

We discuss at least the relation between single track safety and the following activities:

- Setting grinding trains
- Removing residues
- Executing point measurements

Setting grinding trains

Setting a grinding train involves in our opinion at least:

- Setting a grinding train at the start of a track closure to prepare for grinding after having executed transport from depot, autonomous or by an external locomotive;
- Setting all on-board measurement systems;
- Setting a grinding train to execute any local transport in a track closure, for example in between two grinding orders;
- Setting a grinding train at the end of a track closure to prepare for transport back to depot, autonomous or by an external locomotive.

Q.3.1
Which opportunities do you identify for setting without having any crew outside of the train?
If relevant, please differentiate between the four sub activities suggested by us and add other sub activities if needed.

Removing residues

We want to investigate whether a grinding train could possibly be able to capture a high amount of grinding residues, at such an extent that the amount of residues which end up at the track is acceptable.
In that case, no additional railway vehicle would be needed to clean the ground track. In our opinion, omitting any additional railway vehicle would have a significant impact on the safety of single track operations.

Q.3.2
Having your best dust vacuum system in mind, what is your estimation about the amount of grinding residues that will inevitably end up and stay in track? As this will depend on metal removal, please answer for an 0,2 mm metal removal in 1 single pass from A to B.
Could you express this for example with photos or with an estimated weight / volume per 10m ground track? Please differentiate to dust and slags if relevant.

Executing local point measurements

Next to on board condition measurements over the ground length (see chapter 7), we add value to additional ‘point measurements’ on a certain location. We want local point measurements to be executed randomly to demonstrate that (1) surface roughness is compliant with our specs and that (2) the metal removal meets our specifications.

Q.3.3
What possibilities do you identify on executing these two measurements without the need to have any crew entering the ground track?

3.3 Outlook: working without track closures

The starting point is that grinding in the Netherlands must be executed during track closures. But when we imagine a future grinding train which can be set from the inside and which can remove a sufficient amount of residues, we conclude that such an imaginary grinding train would be ready to work without any track closure at all but instead being scheduled in the timetable as a very slow train.

It is highly uncertain if, when and where ProRail (1) would have the need and (2) would be ready to operate grinding without any track closure. But for now, the idea that a future grinding train would be able to do so is attractive by itself. Having a long contract duration in mind, this is a typical aspect for which we want to retain flexibility in our contract.

Q.3.4
What are your thoughts on rail grinding without any track closures and to which extent would your suggested grinding trains be prepared for that?

4 Emissions

4.1 Introduction

During our 2024-market consultation, we concluded that reducing emissions in a way other than using biofuels requires a system jump towards ‘new generation grinding trains’. Hence, this chapter discusses alternative power supplies for these new generation grinding trains. Besides, we pay brief attention to emissions from supporting trucks and cars.

4.2 Reducing emissions from grinding trains

Activities from grinding trains
We have identified the following activities from grinding trains:

1. Transporting over our network: autonomous or towed by an external locomotive;
2. Transporting in a track closure at maximum 40 km/h: autonomous;
3. Setting a grinding train in a track closure to prepare for grinding or for transports;
4. Grinding including vacuuming residues and executing on-board measurements: autonomous;
5. Depot related activities.

Catenary systems
Except for depot related activities, activities 1 t/m 4 must be carried out everywhere on our network. Across the Netherlands, we do operate several catenary systems. See table below. We composed this matrix with the following aspects in mind:

- As we schedule grinding shifts based on track load (cyclic shifts) or rail condition (corrective shifts), any discussion on the use of catenary systems must be based on ‘the share of all grinding shifts’ instead of the ‘share of total track length’;
- ProRail is working on the further electrification of a few regional lines, implementing 1500V DC. Timelines are uncertain.
- Rail grinding on the high-speed line (HSL Zuid; Hoofddorp – Belgian border) is nowadays out of scope for ProRail but might be in scope in a future grinding contract.

Catenary systems and estimated share of grinding shifts in a future grinding contract.

	Geography	**Share grinding shifts (indicative)**
1500V DC	▪ Main lines ▪ Regional lines	± 85 - 90%
25.000V AC	▪ Havenspoorlijn: Maasvlakte – Kijfhoek (cargo only) ▪ Betuweroute: Kijfhoek – German border (cargo only) ▪ HSL Zuid: Hoofddorp – Belgian border (high speed line)	± 5 - 10%
No catenary	▪ Regional lines	± 5%
	▪ First and last mile between depot and 1500V DC catenary	All shifts

Note: keep in mind that every grinding shift involves at least a first mile transport from depot, 1500V DC transports back and forth and a last mile transport back in towards depot, regardless of the actual grinding location.

Your solutions

Q.4.1
What would you need from ProRail in case ProRail specifies that all transports and grinding (see activities 1 t/m 4) must be executed emission-free as long as ProRail provides a 1500V DC catenary? Please explain – at least – your (maximum) power demands from our 1500V DC catenary at certain speeds. And please explain about your fallback solution if ProRail cannot provide your needs at a certain moment or location.

Q.4.2
What would you need from ProRail in case ProRail specifies that all transports and grinding (see activities 1 t/m 4) must be executed emission-free as long as ProRail provides a 25.000V AC catenary?
Please explain – at least – your (maximum) power demands from our 25.000V AC catenary at certain speeds. And please explain about your fallback solution if ProRail cannot provide your needs at a certain moment or location.

Q.4.3
Which power supplies other than fossil fuels do you suggest for transporting and grinding (see activities 1 t/m 4) on railway lines without any overhead lines and in situations where an existing catenary cannot be used? And what would you need from ProRail? Please provide an explanation for your multiple solutions if relevant.

Q.4.4
What is your knowledge and experience with on board registration and payments of consumed electricity?

Cost impact
We prefer to establish a set of specifications on emissions in the future grinding contract. Hence, we would like to investigate the cost impact depending on choices on the severity of these specifications.

Please answer the questions below with the following assumptions in mind:
- An annual turnover of EUR 20 million (price index 2026);
- The need to operate two grinding trains;
- Allocating machine capacity for ProRail for most of the year, allowing limited left-over capacity to serve other clients across the continent;
- Shift price should in this chapter refer to the costs per grinding shift for a certain type of grinding train including depreciation, consumables and crew. Not included in this definition are all costs involved with organizational efforts to execute a specific shift in a specific location such as for example arranging transports, formal track closures and safety.

Q.4.5
What would the cost impact be in case ProRail specifies that all transports and grinding (see activities 1 t/m 4) must be emission-free as long as ProRail provides a 1500V DC catenary?
Please express as a percentage from your reference shift prices for diesel powered grinding trains and please express twice:
- for a contract with certainty of 8 years of operation;
- for a contract with certainty of 15 years of operation.

Q.4.6
What would the cost impact be in case ProRail specifies that all transports and grinding (see activities 1 t/m 4) must be emission-free as long as ProRail provides a 1500V DC and also as long as ProRail provides a 25.000V AC catenary?
Please express as a percentage from your reference shift prices for diesel powered grinding trains and please express twice:
- for a contract with certainty of 8 years of operation;
- for a contract with certainty of 15 years of operation.

Q.4.7
What would the cost impact be in case ProRail specifies that all transports and grinding (see activities 1 t/m 4) must be emission-free, no matter the presence and availability of any catenary?
Please express as a percentage from your reference shift prices for diesel powered grinding trains and please express twice:

- for a contract with certainty of 8 years of operation;
- for a contract with certainty of 15 years of operation.

Depot related activities from grinding trains

So far, this chapter hasn't addressed any depot related activities from grinding trains. Below, we do discuss these activities separately. We identified at least two:

- Daily maintenance, failure recovery and all other kinds of servicing your grinding trains at a depot. We assume that this involves an energy need, for example for the control of grinding motors whilst changing grinding stones;
- 'First mile' transport from a depot to the entry of the 1500V DC catenary and 'the last mile' from the end of the 1500V DC catenary back in towards depot. Our depots are not equipped with any catenary.

Q.4.8
What would you need from ProRail in case ProRail specifies that any daily maintenance, failure recovery and all other kinds of servicing at a depot must be emission free? Keep in mind that installing catenary at a depot is not an option.

Q.4.9
What would the cost impact be in case ProRail specifies that any daily maintenance, failure recovery and all other kinds of servicing at a depot must be emission free?
Please express as a percentage on top of your reference shift-price for a grinding train which is equipped to transport and grind emission-free whilst using (at least) our 1500V DC catenary. And please differentiate for the two above-mentioned sub activities if relevant.

Q.4.10
Which power supplies other than fossil fuels would you suggest for 'the first mile' transportation from a depot to the entry of the 1500V DC catenary and 'the last mile' from the end of the 1500V DC catenary back in towards depot? And what would you need from ProRail for that?
Please explain multiple solutions if relevant.

Q.4.11
What would the cost impact be in case ProRail specifies that the first mile from a depot and last mile towards a depot must be emission free?
Please express as a percentage on top of your reference shift-price for a grinding train which is equipped to transport and grind emission-free as long as ProRail provides a 1500V DC catenary.

Final questions

Q.4.12
Having your answers on Q.4.3 and Q.4.10 in mind, under which contractual conditions are you open to implement any upgrade during the contract period to a more environmental friendly solution if any innovation or changing market conditions (on for example hydrogen) allows to do so?
Do you take such a potential upgrade into account when engineering future grinding trains? And what would you need from ProRail in case any innovation evolves like that during a suggested 10-15 year contract period?

Q.4.13
Would any choice regarding the establishment of emission specifications for grinding trains affect the feasibility, risks or attractiveness of a future grinding contract and your willingness to submit a bid in a future tender?

4.3 Emissions from supporting trucks and cars

We aim to have our future grinding contract aligned with the existing sector-wide strategy on emissions from trucks and cars involved.

Q.4.14
What would the cost impact be in case ProRail specifies that the truck and car movements must be emission free?

Q.4.15
Would any choice regarding the establishment of emission specifications for supporting trucks and cars affect the feasibility, risks or attractiveness of a future grinding contract and your willingness to submit a bid in a future tender?

5 Transportation

5.1 Introduction

In the future grinding contract, arranging and executing transportations over our network will be the responsibility of the contractor. Keep in mind that any discussion in this chapter should be consistent with prior discussions on machine concepts, single track safety and emissions.

5.2 Transportations on in service tracks: safety regimes and communication regimes

During the timespan of the future grinding contract, transportations on in service tracks must be executed meeting several safety regimes.

These safety regimes are:
- ATB-EG: this is our general safety regime;
- ATB-NG: this is a newer version of ATB-EG, installed on some regional lines;
- ERTMS: see below;
- NCBG: this translates as ‘an area not being centrally controlled’ in which our depots are located. Since all train movements in NCBG take place based on visual observation without the need for having specific on board installations, we exclude NCBG from this market consultation.

ERTMS
Today, ERTMS is in operation on a few specific railway lines:
- Havenspoorlijn: Maasvlakte – Kijfhoek (cargo line)
- Betuweroute: Kijfhoek – German border (cargo line)
- HSL Zuid: Hoofddorp – Belgian border (high speed line)
- Utrechtse lijn: Utrecht – Amsterdam (dual signalling combined with ATB-EG)
- Hanzelijn: Zwolle – Lelystad Opstel (dual signalling combined with ATB-EG)

The extension of the ERTMS share of our network can be expected from 2028. This will be done in tranches. The schedule for the first tranche is shared in attachment [8]. Additional tranches are not scheduled yet, but any contractor should take further implementation during the contract period into account.
With today’s knowledge, having availability of at least ‘*ERTMS baseline 4 system version 3.0’* should allow both ERTMS-compatibility during the contract period and compatibility with FRMCS (see next page).

Furthermore, we want to inform you about a Specific Transmission Module (STM). This interface allows any train equipped with ERTMS to be compatible with both ATB-EG and ATB-NG. Hence, a combination of ERTMS baseline 4 system version 3.0 and an ATB-STM would allow for transportations all over our network. But obviously, this is just a suggestion and other solutions might work as well.

ERTMS: compatibility with ESC-types
As ERTMS-hardware in our tracks is installed by multiple suppliers (think for example of: Alstom, Siemens, Hitachi etcetera), a differentiation in several ‘ESC-types’ has occurred. By May 2026, we identify at least 20+ distinct ESC-types.
A contractor must test his on board hardware with all ESC-types to demonstrate compatibility. To facilitate in-house testing, ProRail offers the ProRail ERTMS Integration Lab (PREI). Hence, a contractor must install an extra onboard unit in this PREI. Such a duplicate allows for future testing as well, as ProRail expects to install additional ESC-types during the contract period.

Communication: GSM-R and FRMCS
GSM-R is our current communication regime and is used all over our network, regardless of the safety regime per railway line. GSM-R has an estimated end of life around 2035, obviously in the timespan of a future contract.
GSM-R will be replaced by its European successor FRMCS. This means that during the contract period, our contractor must make the transition from using GSM-R to using FRMCS.
But as FRMCS hardware will be released at earliest around 2028 – 2030, it is impossible to install both GSM-R and FRMCS in the near future. This FRMCS timeline adds complexity to executing transports.

5.3 Autonomous transportation versus pilot-locomotive

Having all information above in mind, we move on to the debate about using a pilot-locomotive or transporting autonomously. In the matrix below, we identified our thoughts and assumptions on both solutions. This matrix is far from perfect and must be seen as a starting point for discussion.

	Advantages	**Disadvantages**
Autonomous transportation	▪ A combination of ERTMS baseline 4 system version 3.0 and an ATB-STM does the job network-wide. ▪ Most efficient in setting a grinding train at the start and at the end of a track closure, leaving most time for grinding production. ▪ Most versatile logistics when a grinding train is equipped with two transportation directions. ▪ Grinding train is able to work without any track closure.	▪ Requires self-signaling and formal homologation. ▪ Requires an ERTMS-duplicate at the PREI lab for ESC-testing. ▪ Later installation of FRMCS (earliest: 2028 – 2030) might require additional homologation and could possibly result in unacceptable downtime.
Pilot-loco transportation	▪ No need for formal homologation of grinding trains. Only a simpler TCVT-certification for working mode plus a permit to be towed suffices. ▪ Depending on safety regimes, ERTMS-baselines, ESC-types, and operation of GSM-R versus FRMCS, a matching pilot-loc can be arranged. This is a matter of outsourcing complexity.	▪ Uncertainty in availability of a homologated pilot-loco (or two) which matches both the right safety regimes and our specifications on emissions. ▪ Least efficient in setting a grinding train at the start and at the end of a track closure, leaving less time for grinding production. ▪ Possible logistic complexity when having single track closure. ▪ Possible logistic complexity around depots as the pilot-loco must go around to prevent a lock-in. ▪ Working without track closure is not permitted.

Q.5.1
What is your knowledge and experience on autonomous transportations under several safety regimes?

Q.5.2
What is your knowledge and experience on pilot-loco transportations under several safety regimes and associated logistics involved?

Q.5.3
What is your knowledge and experience on ERTMS baseline 4 system version 3.0, regardless of autonomous transportations or pilot-loco transportations?

Q.5.4
Is the ERTMS platform which you consider expandable with FRMCS? Please explain.

Q.5.5
What would you suggest for dealing with FRMCS-related costs, assuming that those costs cannot be calculated during the tender phase as long as FRMCS-hardware is not released and available?

Q.5.6
What is your view of the advantages and disadvantages as we have identified for both autonomous transportations and pilot-loco transportations?
Feel free to cancel any of our (dis)advantages and to address new (dis)advantages.

Q.5.7
Which solution would you prefer for the duration of the contract, taking all (dis)advantages into account? Please explain if your answer makes a differentiation between a short term solution and a long term solution.

Q.5.8
What are your thoughts on a contract in which ProRail specifies that after ± 3 contract years all transports must be executed autonomously, leaving the first ± 3 contract years the possibility to use an external pilot-loco whilst providing grinding trains with FRMCS and arranging homologation?

6 Depots

In this chapter we examine the compatibility between your suggested new generation grinding trains and our depots. Therefore, we have compiled a depot catalogue (shared document) containing the relevant characteristics of our five depots, which are not identical to one another.

In general, we assume that no major upgrade of our depots will take place. Nevertheless, in this market consultation we would like to investigate if any modification of our depots would make a difference.

Q.6.1
What is the maximum length of your suggested grinding trains?

Q.6.2
What is the compatibility between the grinding trains you propose and our five depots with respect to service track length and the possibility that any pilot-locomotive will be used?

Q.6.3
When requesting at least 5m horizontal distance as a buffer between (1) the end of a fluid tight floor and (2) any handling on grinding motors, grinding stones and hydraulic systems, what is the compatibility between the grinding trains you propose and our depots with respect to the length of the fluid tight floors?

Q.6.4
What is the compatibility between the (electric) power supply and your needs for your suggested grinding trains? Keep in mind that this might overlap with Q.4.8.

Q.6.5
Which modifications would you suggest on which of our depots and what would be the benefits?

Q.6.6
Do you agree with us that depots should not be equipped with a catenary to guarantee safety and flexibility in your daily maintenance, failure recovery and all other kinds of servicing activities? Please explain.

7 Collecting data

7.1 Introduction

This chapter discusses the train-born performance of measurements, not to be confused with any local (point) measurements being part of quality management. For ProRail, train-born collected data and information supports:

- Reporting information on rail maintenance (quantitative)
- Rail maintenance decisions (qualitative).

7.2 Reporting information on rail maintenance (quantitative)

ProRail aims to collect, analyze and present quantitative rail grinding data. This data contains information on at least:

- Where rail grinding has been performed (track and km logging)
- When rail grinding has been performed (date)
- What rail grinding has been performed (cyclic or corrective and metal removal)
- Whether deviations have occurred with respect to planning.
- Data on transverse and longitudinal rail profiles (% within tolerance) as defined in EN13231-2:2020.

Q.7.1
What is your knowledge and experience with train-born registration of quantitative data and reporting in a standardized digital way?

Q.7.2
How should ProRail specify delivery formats in a future contract, to stay close to off the shelf systems you are likely to operate?

Q.7.3
Which opportunities do you identify on integrating any deviations during a grinding shift (not ground as planned) in datasets containing quantitative information on a grinding shift?

7.3 Rail maintenance decisions (qualitative)

Post grinding condition data or information delivered by the rail grinding contractor will be used to support rail maintenance decisions. Data from multiple resources (the rail grinding contactor will be one of those) will be combined and presented in a user-friendly interface.
ProRail will use these qualitative condition data to:

- Evaluate and fine-tune the cyclic rail grinding intervals, ideally working towards tailor-made intervals per track;
- Initiate any additional corrective rail maintenance;
- To support any decision making.

Dataset
The rail condition dataset therefore should contain information on:

- Need: Measurements on the transversal rail head profile: deviation between actual and target profile. These data must be acquired both before and after grinding.
- Need: Rail defects: Eddy Current measurements on both the gauge corner and top of rail.
- Optional: ProRail might be interested in additional condition data, and we are open to discussing any valuable suggestion.

Interface
ProRail has a standardized digital interface to upload both quantitative and qualitative data. We prefer to work with our own dashboard and GIS application, to be compatible with (possible) multiple data suppliers and to avoid any vendor lock-in.
Hence, we expect any future grinding contractor to transfer this (raw) data on a regular basis.

Q.7.4
What is your opinion on the transfer of rail condition data to ProRail as part of the total service?

Q.7.5
When discussing transversal profile measurement according to EN13231-2:2020:

- What kind of measurement system or technology do you suggest for a future grinding contract?
- What is the resolution (data points per meter) of this technology?
- What is the precision (error margin) of this technology?
- What is the reliability (mean time between failure) of this technology?
- To which extent is this technology able to detect the location of the running band on the rail?
- To which extent would an upgrade of this technology be feasible during the contract period?
- What is the maximum traveling speed on which this technology applies and would it be possible to measure during transportations over our network?

Q.7.6
When discussing rail defect detection according to EN16729-1:2016:

- What kind of measurement system or technology do you suggest for a future grinding contract?
- What is the defect depth range of this technology?
- What is the resolution (data points per meter) of this technology?
- What is the precision (error margin) of this technology?
- What is the reliability (mean time between failure) of this technology?
- To which extent would an upgrade of this technology be feasible during the contract period?
- What is the maximum traveling speed on which this technology applies and would it be possible to measure during transportations over our network?

Q.7.7
When discussing measuring rail corrugation detection in relation to EN15610:2019 + A1:2025 and EN13231-2:2020:

- What kind of measurement system or technology do you suggest for a future grinding contract?
- What is the resolution (data points per meter) of this technology?
- What is the precision (error margin) of this technology?
- What is the reliability (mean time between failure) of this technology?
- To which extent would an upgrade of this technology be feasible during the contract period?
- What is the maximum traveling speed on which this technology applies, and would it be possible to measure during transportations over our network?

Q.7.8
What interval in time between the performance of the grinding / measurements and the transfer of condition data would you consider feasible?

Q.7.9
Given the fact that rail grinding itself has priority over acquiring condition data, how would you suggest ProRail to deal with any failure or malfunction of measurement systems? Do you have any suggestion to implement a proportional incentive in a future contract?

Q.7.10
What is your knowledge and experience with any on board switch-specific measurements? Please explain with respect to constraints due to switch constructions.

Q.7.11
What is your opinion on a requirement to permit the installation of any additional on board measurement systems? Either as part of the contract or to facilitate ProRail.

Q.7.12
What would you suggest ProRail to specify about keeping up-to-date with future developments on measuring condition data, which will inevitably occur during a certain contract period?

Q.7.13
Would any choice with respect to specifications of condition data have a significant influence on the attractivity on a future contract? Please explain.

8 Partners in optimization

8.1 Introduction

ProRail aims to organize the technical management in close cooperation with its grinding company. In this chapter ProRail would like to investigate how this collaboration can be structured and to what extent it can develop into a collaboration on a joint asset management strategy.

The topics and questions in this chapter evolve from operational cooperation (running the contract) to joint asset management partnership in the maintenance of rails. These involve:

- Optimization in qualitative grinding performance
- Optimization per individual grinding shift
- Optimization in scheduling
- Optimization in joint asset management

8.2 Optimization in qualitative grinding performance

In recurring technical meetings, ProRail aims to discuss the results of recent grinding shifts and the compliance with technical specifications according to RLN00065-2 V003 (shared document). These discussions involve for example:

- Deviations in transversal profiles: output profiles not meeting tolerances from our specifications in relation to input profiles.
- Deviations in surface quality in relation to quantitative goals.

Q.8.1
What are your thoughts on organizing the periodic meetings, presenting the results and proposing improvements based on identified deviations, and research?

Q.8.2
What information on the transverse rail profile do you need from ProRail in order to obtain any quantitative goals on 0,2 mm (tangent) – 0,3 mm (curve) metal removal and to deliver the ground rails within tolerances on transversal profiles according RLN00065-2 V003?

Q.8.3
How do you organize keeping your project management staff and operational crew aligned, for example to have deviations and optimization opportunities reliably reported outside - in?

8.3 Optimization per individual grinding shift

As the duration of track closure may be longer than the time needed to perform all scheduled activities (grinding + all additional activities needed such as safety handling and setting machines), a share of all grinding shifts will contain theoretical spare time in the range 10 – 60 minutes (or sometimes even longer).
The availability of spare time offers the opportunity to optimize a grinding shift. We identify two ways of optimizing:

- Condition-based optimization during the preparation of that grinding shift, assigning additional grinding passes;
- Condition-based optimization during shift performance, based on the insights of operational crew using live condition measurements. As some grinding shifts proceed faster than (theoretically) planned, we expect a grinding contractor to adjust its approach for each shift based on the measured condition. As ProRail only visits grinding shifts randomly, the grinding company itself must take the lead in these adjustments.

Q.8.4
What are your thoughts on taking initiatives for meetings for establishing additional grinding passes during the preparation phase of a grinding shift and adjusting the planning based on that outcome?

Q.8.5
What are your thoughts on establishing additional grinding passes during execution, on the initiative of the operational crew using live condition measurements?

Q.8.6
Follow up on Q.8.5: What guidelines do you need from ProRail to be able implement any condition-based optimization strategy (a predefined priority-matrix for instance)?

8.4 Optimization of the grinding schedule

The evaluation of the line-specific rail condition may result in changes in rail grinding specifications, scheduling additional shifts or the redistribution of shifts on the network.
ProRail may perform the necessary analyses and propose the grinding schedule updates. Based on experience, knowledge and extensive knowledge on the capacity of the grinding trains, the grinding contractor may even take the lead on this.

Q.8.7
What are your thoughts on the optimization of grinding schedules? Who has to take initiative on this?

Q.8.8
If you believe that you can play a major role in the network-wide optimization of the grinding plan, what experience do you have in this area, and which people would you like to involve in this?

8.5 Collaboration to optimize rail asset management

In our perception, optimization at the asset management level is the highest ‘stage’ in collaboration between ProRail and its grinding contractor. In our view, this is as well the most difficult matter since this is about long-term effects of asset management choices to be made.

Q.8.9
What are your thoughts on the collaboration to optimize rail asset management?

Q.8.10
Would the scope of this collaboration be the optimization of line performance or network wide?

Q.8.11
How would you suggest that the collaboration is being organized? Do analysts or engineers be part of a shared grinding team, or do you see this differently?

Q.8.12
If you are in favor of intensive collaboration, which analytical tools and experience do you bring to the collaboration, and what should ProRail contribute?

8.6 Awarding criteria (EMVI)

As you might have concluded in the chapters before, we have a preference for establishing specifications on several topics. The outcome of such an approach could however be that awarding a contract would be based almost exclusively on price.
We would like to avoid that. Hence, we feel the need to leave space for competitive advantages on aspects other than price. In our opinion, this should mainly be about being partners in optimization and building long-term collaboration, on the various levels discussed in this chapter so far.

Q.8.13
What would you suggest ProRail to create competitive advantage on ‘partnership in optimization’ in a tender? Feel free to pitch your ideas and feel free to address the four levels of optimization as discussed so far, or even additional levels. And what criteria do you suggest ProRail to examine any proposals?

9 Certainty & flexibility

9.1 Introduction

In this chapter we would like to address the tension between certainty and flexibility. We would like to investigate your needs on certainty, whilst at the same time investigating how we can retain flexibility in our contract.

9.2 Certainty

Q.9.1
Having our ambitions on 'new generation grinding trains' in mind, what is the minimum contract duration for you to participate in a tender? Please explain.

Q.9.2.
Having our ambitions on 'new generation grinding trains' in mind, what would be the optimal contract duration for you to participate in a tender? Please explain which benefits occur compared to Q.9.1.

Q.9.3
What is the minimum mobilization period (time between awarding a contract and the actual start of grinding) to meet all our specifications? Please answer in threefold:

- With respect to TVTC-certification of your grinding trains;
- With respect to TVTC-certification and homologation of your grinding trains for autonomous transports from the very start of the contract;
- With respect to all other aspects for working in ProRail's context (understanding procedures in planning, safety etc).

Q.9.4
How do you deal with investments to be made during the mobilization period?

9.3 Flexibility

We know one thing for sure: technical needs will change during the contract period. As a consequence, the brand new grinding contract will become outdated in some ways as the years pass by. Hence, we want to retain flexibility on various points in our contract and the ability to implement changes to the service. Think of for example:

- Specifications and measurement systems: grinding technology, grinding patterns and measurement systems will develop over time;
- Track closures: we already discussed that ProRail might feel the need to work without any track closure on some railway lines in the future;
- Power supply: we already discussed the concept of swapping a biodiesel-wagon for a more environmental friendly alternative such as a hydrogen-wagon;

Q.9.5
What is your view of having flexibility in a future grinding contract, and to which extent does this conflict with your need for certainty?

Q.9.6
What are your suggestions for contractual incentives to support any further innovation during the contract period?

Q.9.7
Which possible developments do you expect to implement later than the actual start of the contract, likely somewhere during the contract period? What is your estimated timeline? Please explain.