

Request for Information

HotBox detection management, maintenance and renewal



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1. Introduction

This Request for Information (RfI) is published in preparation of a possible tender for HotBox detection management, maintenance and renewal activities in The Netherlands. ProRail would like to know how they can achieve their goals on detecting and actioning AxleBox- and Break issues from wayside monitoring locations in the Netherlands to reduce derailment risk. ProRail is also interested to know what the future vision is regarding innovations and new possibilities. ProRail is open for all proven ideas.

1.1 ProRail B.V.

ProRail B.V. is responsible for the railway network in the Netherlands: construction, maintenance, management and safety. Every day, 24/7 employees make sure that 1,200,000 travellers and 100,000 tons of goods arrive at their destination, with 6,550 trains over more than 7,000 kilometres of track. The railway network is the beating heart of the transport within The Netherlands. ProRail is working on the accessibility of the Netherlands by ensuring an optimal rail network. We distribute capacity on the track, arrange all train traffic, build and manage stations and lay new track. ProRail also maintains existing infrastructure such as rail, switches, signals and level crossings.

1.2 HotBox detection

The Dutch railway network is equipped with a detection system for measuring the temperatures of axles and wheels (HotBox). HotBox sensors along the track detect whether the temperature of a wheel or axle box is too high. The system therefore contributes to the reduction of derailment risk and damage to the infrastructure. For example, when a train has high axle or wheel temperature there is a greater risk of derailment. If HotBox detects a too high value, the driver is asked to stop the train and check the AxleBox/ Break and/or Wheelset. HotBox detection measures the temperature of axles and wheels using infrared scanners. The temperatures of the axles on the left and right sides are measured. If the temperature of an axle is high, the axle could jam and the train might derail. The temperature of the wheels is measured on one side. If the temperature of a wheel is high, it implies that a brake is jammed. Jammed brakes and hot axles occur primarily on freight rolling stock. An axle can develop into a 'hot axle' within 80 kilometres. Hotbox detectors are therefore installed with a spacing of 80 kilometres along the entire length of freight corridors. HotBox detection systems have been installed at 34 sites throughout the Dutch railway network. HotBox detection is installed on the main freight corridors in such a manner as to ensure that freight trains are measured every 80 kilometres and before entering tunnels. ProRail also carries out various analyses using the data from HotBox detection at the request of both internal and external parties. For example, for transport operators, contractors, experts and route managers.

1.3 Background

Hotbox detection is installed in the Dutch railway system for various reasons. One of these is the duty of care of ProRail with regard to the safe use of the rail network. Since 1998, the system has been installed, dismantled and upgraded on several occasions. ProRail installed HotBox detection on the Brabant Route in 1998. In 2002, however, these systems were dismantled due to the large number of false alarms. In 2007 ProRail installed HotBox detection on the Betuwe Route, due to the large numbers of tunnels along the line.

By this time, the technology had been greatly improved and the systems rendered reliable. A number of derailments occurred between 2005 and 2009 (2005 Boxtel, 2008 Muiderpoort, 2009 Vleuten and Venlo) which caused major damage to the railway network and which (according to the investigation reports) could have been prevented by Hotbox detection. The reports also stated that ProRail has a duty of care. ProRail therefore began rolling out HotBox detection throughout the Dutch railway network in 2009. In 2021 4 new locations were installed to be compliant with TSI for Tunnels.

1.3.1 Duty of Care

Pursuant to the Railways Act and the management concession, ProRail has a *Duty of Care*. The Railways Act states that the Minister shall grant a management concession in which responsibility for the infrastructure is assigned to the infrastructure manager, which is obliged to take appropriate measures for the safe use of the main railway lines. For example, Article 3 of the management concession (the duty of care) states that ProRail bears responsibility for the following:

1. To vouch for the safe and efficient usage of the main railway infrastructure, without excessive wear and tear on rail vehicles.
2. To analyse the risks of the use and management for the safety of the main railway infrastructure and to take appropriate measures, including taking part of the main railway network out of service, in order to adequately manage these risks.

ProRail fulfils its duty of care by means of HotBox detection and by providing transport operators with daily reports. However, responsibility for rolling stock remains with the transport operator. According to the Railways Act (Article 36), it is prohibited to run on a main railway using a rail vehicle that does not have the characteristics necessary for safe use of the railway infrastructure in question. The primary responsibility for a material defect therefore lies with the parties involved in the rail vehicle. The Human Environment and Transport Inspectorate (IL&T) is responsible for supervising this.

1.3.2 Active Signaling: Reduction of derailment risk.

Active signaling or alerting implies that staff authorising train movements stop a train if there is an increased risk of derailment. If a too high temperature is measured by HotBox detection, the movements inspector receives a phone call (GSM-R call). The movement inspector contacts the train driver and follows a procedure to stop the train (in a controlled manner) and checks the specific wheel/ break and/or axle box.

1.3.3 HotBox detection Locations and systems

At this moment ProRail has Hotbox systems on 74 Tracks (34 locations) in the Netherlands.

- 6 locations on the Betuweroute (installed in 2007, refurbished in 2019/2020) (Voestalpine Signaling Phoenix MB)
- 2 locations on the Havenspoorlijn (Installed in 2007, refurbished in 2019/2022) (Voestalpine Signaling Phoenix MB)
- 22 locations on the mixed net (Installed from 2009 – 2016) (Voestalpine Signaling Phoenix MB)
- 4 locations on the mixed net (installed in 2021) (Voestalpine Signaling Phoenix MDS hbd/hwd)

1.4 Scope

ProRail currently has two contracts which support HotBox detection management, maintenance and renewal. From 2025 ProRail prefers new contract(s) for HotBox detection management, maintenance and renewal. This/these contract(s) should support optimal purchasing of functionality for the detection of hot wheels and/or hot axle boxes. This could concern management & maintenance of existing HotBox installations, replacement of existing installations, installation of new installations and services associated with Hotbox detection.

The following requirements regarding availability, reliability and recovery times must be in place to be unburdened as much as possible:

- Cost effectiveness;
- Minimum 99% availability;
- At least 95% reliable;
- Function recovery within 72 hours;
- Direct data delivery to our ICT infrastructure (live) (GSMR / Fiber optic).

ProRail is currently exploring two options regarding the situation as per 2025:

Option 1: Focus on renovation of existing installations

Option 2: Total renewal of installations

2 Procedure Rfl

2.1 Introduction

By means of this RFI, ProRail intends to obtain answers to several questions from the contractors in the market, so that on this basis, it can position the possible tender(s) better in the market. In addition, it tries to reach as many contractors as possible in order to interest them and encourage them to contribute ideas.

2.2 Procedure

This Rfl is published on Tendered, which means all suppliers can participate. This is a written procedure, with an optional dialogue. You are requested to fill in the enclosed questionnaire and submit it before the date mentioned in paragraph 2.3 by email: arno.odijk@prorail.nl. You can state your answers in Dutch or English. If answers are unclear, raise questions or need deepening, ProRail reserves the right to ask for clarification either written or by means of a dialogue. No report will be published of the Rfl. The results of the Rfl can be incorporated in the tender documents.

2.3 Planning

Date	Activity
24 May 2022	Publication
7 June 2022	Deadline and time for asking questions about the RFI procedure (by email: arno.odijk@prorail.nl)
15 June 2022	Deadline for answering questions via the Information Memorandum
29 June 2022	Deadline and time for submitting your completed Questionnaire (by email: arno.odijk@prorail.nl)
4 - 8 July 2022	Dialogue (optional)

2.4 Open and honest

Participation in the Rfl is completely voluntary and will not lead to any privileges in a tender. Likewise, not participating in the market consultation will not lead to exclusion from a possible tender. By participating in this Rfl, you agree that the information you provide may be used by ProRail in (the preparation of) the tender. Commercial (numerical) information provided by you will be treated confidentially by ProRail. ProRail values a transparent process. It is not the intention to favor participating market parties in the Rfl or to place non-participating parties at a disadvantage. Any costs for participating in this market consultation will not be reimbursed.

3 Questionnaire

Contact information	
Company name	
Name contact person	
Phone contact person	
e-mail contact person	
Address	
Postal code	
City	

3.1 Introduction

1a	Can you give a concise description of your organization and the services it offers?

3.2 Wayside Monitoring systems / HotBox detection

2a	Please describe your company's relevant experience with Wayside Monitoring systems
2b	What experience does your company specifically have with monitoring of wheel and axle temperatures?

2c	Do you currently have a system available for hotbox detection? If so, please elaborate: • on the functionalities and possibilities of the system; • If the system is validated by a track-manager such as ProRail or an independent third party; • If not validated, are you willing to validate your system, including an indication of the required time frame? If you don't have a system available, please elaborate: • whether you are willing to develop a system for hotbox detection? • Time needed for development and validation • Other relevant information.
2d	Can you deliver according the proposed main requirements in terms of availability, reliability, maintainability etc.? Do you have suggestion regarding these requirements?
2e	Are you able to renovate current HotBox detection systems in use? If yes, which preconditions are applicable?
2f	What other (future) functionalities/ possibilities are available measuring wheels? (e.g. axle box defects, brake pad conditions etc.)

3.3 Data Delivery

3a	What is your experience with the handling of live data delivery with safety impact relating to wayside monitoring? Please elaborate. What options do you have to deliver the data live (GSMR now)? Do you have the possibility to deliver data via fiber optic?
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3.4 Costs

4a	Can you give a rough estimate of Option 1: Renovation of existing installations?
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4b	Can you give a rough estimate of Option 2: Total renewal of installations?
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4c	Can you give an indication of the lifespan for both scenarios?
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4d	In your opinion, are there other scenarios besides the two mentioned in this RfI?
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3.5 Other

5a	What are the possibilities for third parties to carry out work or management and maintenance on your systems? How can ProRail prevent a vendor lock-in situation?
5b	What future developments do you see in the market of wayside monitoring?
5c	Are there any other matters that you want to give to ProRail with the aim of putting the best possible tender on the market?