

**IMPRESE FERROVIARIE con certificato di  
sicurezza per traffico merci**

Loro SEDI

**Soggetti Responsabili della Manutenzione  
carri merci**

Loro SEDI

**Detentori carri merci**

Loro SEDI

**RETE FERROVIARIA ITALIANA S.p.A.**

**Direzione Tecnica**

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TRASPORTI**

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**Oggetto: Safety Alert relativo a problemi connessi all'utilizzo di soles del freno, realizzate in  
materiale composito, a bassissime temperature.**

**Allegato: Safety alert inviato dall'Autorità Nazionale per la sicurezza della Finlandia.**

Si trasmette in allegato il "Safety Alert", inviato dall'Autorità Nazionale per la sicurezza finlandese, attraverso il sistema informatico dell'ERA Safety Information System, a cui si rimanda per gli ulteriori dettagli sulla problematica in oggetto.

Si evidenzia che è stata rilevata una ridotta capacità frenante dei veicoli, in condizioni invernali estreme, probabilmente dovuta ad una insufficiente dissipazione del calore da parte delle soles che non consente di sciogliere il ghiaccio e la neve presenti tra ruota e freno.

Codesti Soggetti, ognuno per la parte di propria competenza, devono adottare tutti gli opportuni accorgimenti, scambiandosi, nel rispetto dell'art. 5, comma 5 del Regolamento Europeo n. 445/2011, le informazioni necessarie ad evitare che gli eventi possano ripetersi, comunicando alla scrivente Agenzia se nel proprio contesto operativo siano già accaduti inconvenienti simili e indicando i provvedimenti adottati.



IL DIRETTORE  
ing. Amedeo Gargiulo



## SAFETY ALERT

|  |  |  |
|--|--|--|
| <b>SYSTEM/ EQUIPMENT</b>   | Composite brake blocks in winter conditions  |  |
| <b>SAFETY ISSUE DESCRIPTION</b>                                    | Finnish operator VR Group Ltd has noticed that composite brake blocks aren't working properly especially in severe winter conditions. Braking performance has diminished and the braking/stopping distances have become longer, in some cases even dangerously. Partial loss of braking performance is not systematic but more sudden and unpredictable in nature.   |  |
| <b>CIRCUMSTANCES</b><br><i>(e.g. special weather conditions)</i>   | Snps and Snpss wagons are used to transport timber. Wagons are equipped with brake blocks C333 in K16 bogie assembly. Wagons have been in use for about eight years. During this period wagons have had issues with braking, most severe issue being lack of braking power in certain winter conditions. The braking power issue has recently worsened when these wagons have been used to form whole trains. Previously the trains had also older wagons with cast iron brake blocks in them. Almost all of the occurrences have been reported in wintertime in the northernmost part of Finland. |  |
| <b>REASON FOR ISSUE</b>  | Heat dissipation from the block seems not to be sufficient to melt the ice and snow between the block and wheel. Due to lower friction coefficient of the block, the braking force applied to block is lower which also makes it more difficult to remove ice and snow from between the block and wheel.   |  |
| <b>LIST OF SUPPORTING DOCUMENTS</b><br><i>(e.g. PHOTOS, LINKS)</i> | ANNEX 1. VR presentation "Winter conditions and composite brake blocks"  |  |
| <b>LINKED WITH OCCURRENCE NOTIFIED TO ERA DATABASE?</b>            | Choose an item.  | <b>LINK TO ERA NOTIFICATION</b><br><br>Click here to enter text. |
|  | <b>OCCURRENCE DATE</b><br>Click here to enter a date.  |  |

## ISSUER

|                     |   |                     |   |
|---------------------|---|---------------------|---|
| <b>ORGANISATION</b> | Finnish Transport Safety Agency   |                     |   |
| <b>CONTACT DATA</b> |  | +358 29 534<br>5000 |  kirjaamo@trafi.fi |
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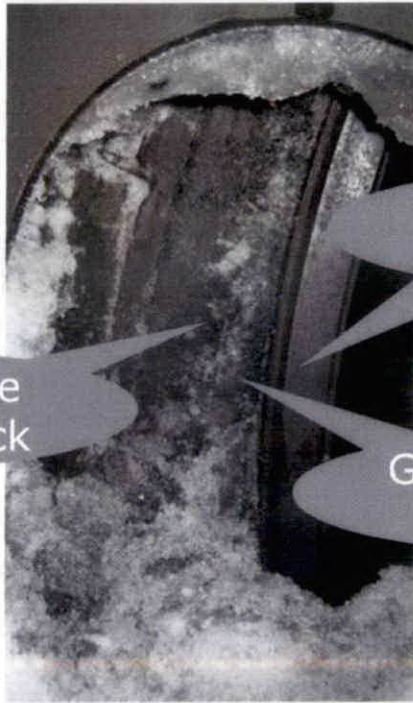
# Winter conditions and composite brake blocks Annex

VR Group, Finland

26.04.2016

Tanja Lähdetluoma

Director, European Affairs



Wheel

Composite  
brake block

Gathered ice  
and snow

## Overview

- Composite brake blocks cause safety problems in Northern Europe
- Multiple near-miss situations and feedback from train drivers of braking problems after raw timber trains, consisting only of composite brake block equipped wagons, began operating.
- Incidents caused by prolonged braking distances due to accumulation of ice and snow

## Actions taken

- Analysis of incident reports
- Analysis of weather conditions
- Analysis of information from train data recorder ("black box")
- Feedback survey with train drivers
- Investigation of different technical solutions

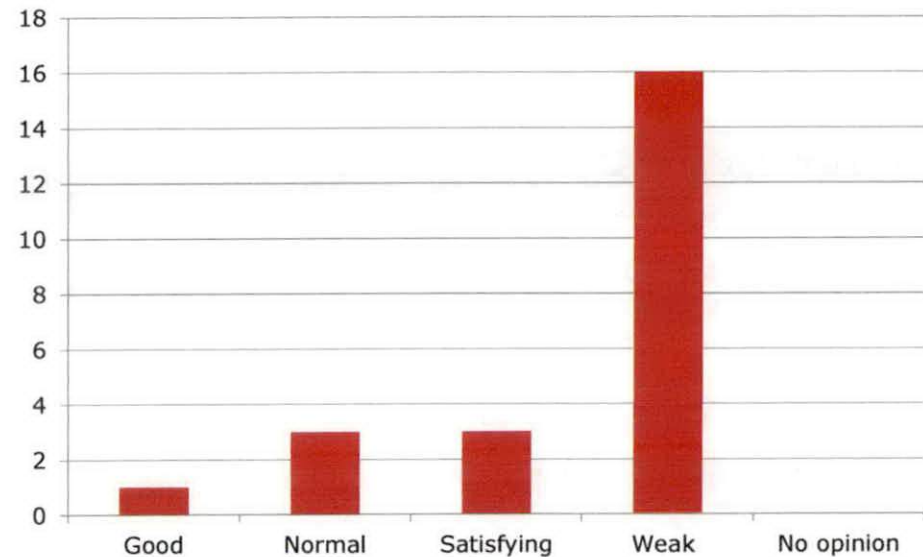
No solution found to  
eliminate winter braking  
problems.

| Date       | Weather condition (if reported)   | Incident Description  | Braking details  |
|------------|---|---|--|
| 25.2.2016  | Temperature - 7 °C, little bit of powder snow.  | Braking power very poor, no imminent danger                                     | From low speed, the speed did not decrease on a gentle downward slope.   |
| 15.2.2016  | Temperature -2 °C, rail tracks have been cleared of snow, moderate amount of powder snow. | Longer stopping distance than normal, no imminent danger                        | The stopping distance was approximately 2km at speed 60 kph (on a downward slope)  |
| 2.2.2016   | -   | Coupling difficulties during shunting works                                     | Despite of full braking, the empty train did not stay in standstill when locomotive was being coupled  |
| 2.2.2016   | -   | Unpermitted passing of STOP-signal  | The braking was initiated on the pre-signal, but due to poor braking performance, the train passed the STOP-signal.  |
| 26.1.2016  | -   | The train stopped on a hill due to poor adhesion and did not stay in standstill | The train did not stay in standstill on Hanhikoski hill despite of service braking. It rolled backwards approx. 150m after emergency braking.  |
| 22.1.2016  | Temperature -15 °. Powder snow.   | Poor braking performance on line  | The distance to STOP-signal 1000 m and speed 40 kph when braking was initiated. The braking power appeared only 450 m before the STOP-signal. The train stopped 130 m before the STOP-signal |
| 19.12.2015 | Temperature 0 °C and snow.  | The train did not stop in shunting works  | The standstill train started rolling shunting works on a small downhill. The train stopped only after 200 meters of emergency braking.   |
| 29.1.2015  | Snow on the rail tracks.  | The train stopped on hill and did not stay in standstill                        | Train moved backwards 200m despite of emergency braking  |
| 20.1.2015  | -   | The train stopped on hill and did not stay in standstill                        | Train moved backwards 200m despite of emergency braking  |
| 16.1.2015  | Temperature -20 °C and snow.  | Too long stopping distance in shunting works                                    | The stopping distance was 200m at speed 10 kph   |
| 13.1.2015  | Temperature -22 °C .  | Too long stopping distance in shunting works                                    | The stopping distance was 400m at speed 20 kph   |
| 5.1.2015   | -   | Unpermitted passing of STOP-signal  | The stopping distance was 300m at speed 35 kph   |

## Feedback from train drivers

- Train drivers were invited to evaluate the braking performance of composite brake block equipped freight trains
- Feedback was collected with an electronic survey. The replies were collected between 10.2. – 6.4.2016.
- 23 replies from drivers of raw timber trains. The feedback included replies from both drivers performing commercial traffic and drivers performing shunting works
- 16 out of 23 train drivers evaluated braking performance of composite brake block equipped trains to be low

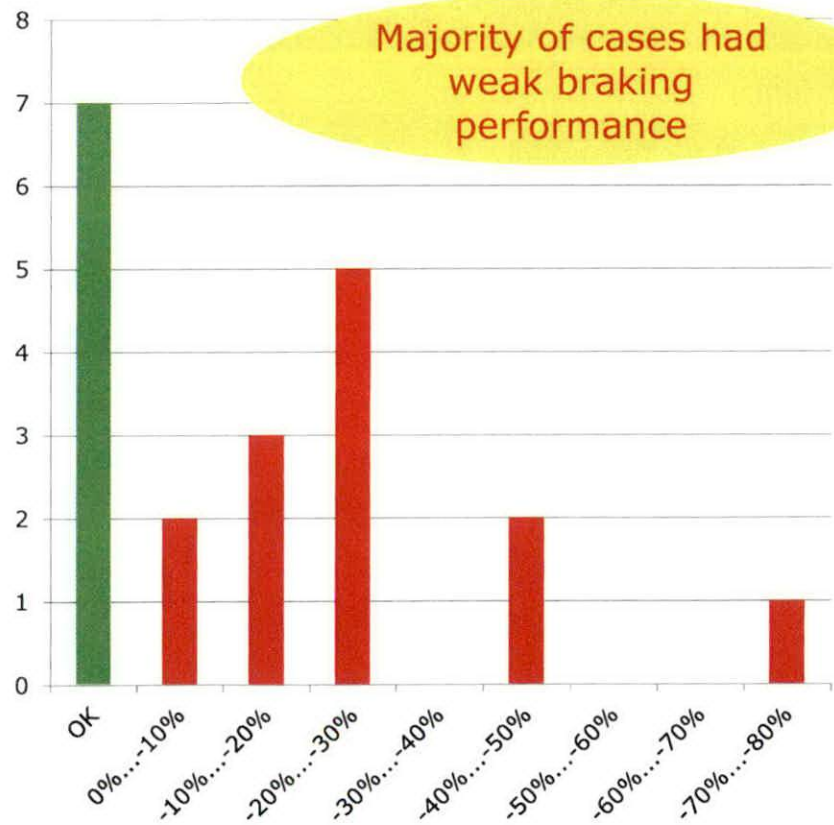
## Assesment of braking performance



Majority of the train drivers considered the braking performance of composite brake blocks weak.

## Actual winter decelerations vs. nominal decelerations with raw timber wagons

- Analysis of data collected from locomotives' data recorder in February 2016
- The data is from raw timber trains equipped with composite brake blocks. Data sample of 20 cases. Only data with over 5 second continuous braking were analyzed.
- Actual decelerations of the trains vs. nominal decelerations (according to ATC system values). The nominal values indicate the maximum allowed braking distance from specific speed.
- A track gradients and the characteristic pressure of the brake pipe have been compensated in the calculations as a mitigating factor. This means the actual braking performance may be even less than indicated in the graph.
- Less than nominal decelerations are shown in the red piles, which indicate prolonged braking distances. Less than -40% would indicate a very low braking capability.
- 13 out of 20 cases in the sample material had prolonged braking distances, which means in these cases the braking performance is less than allowed
- 7 out of 20 cases in the sample material had normal braking distances. This variety in the results also indicates that the braking performance cannot be anticipated by the driver and the risk of sudden loss of brakes emerges.



Actual deceleration in comparison to nominal minimum value

## Investigation of different technical solutions

- VR started operating raw timber trains equipped with only composite brake block wagons in commercial traffic in 2014. Earlier we had operated only with mixed train compositions: part of wagons were equipped with composite brake blocks, part were equipped with cast-iron blocks. The brake performance problems had not appeared earlier with mixed compositions.
- Based on the incident reports, it has been analyzed that specific locomotive or vehicle units do not have a correlation with the incident reports (reports include different locomotive and wagon units). The driver's age or work experience did not have a correlation either.
- Based on experiences of the first winter (2014-2015) we have tried to solve the problem technically and operationally. The raw timber train consists of a locomotive and 22 freight wagons
  - The brake type of the raw timber train was changed from G to P to provide more impulsive braking to remove ice and snow from the braking system.
  - During winter 2015-2016 we have tested a raw timber train composition so that the first and the last wagon is replaced with wagon with cast-iron blocks.
  - These measures have unfortunately been ineffective and have not provided a solution the problem.
- The technical solution to provide better braking performance is to increase the number of vehicles with cast-iron blocks significantly or to replace the composite brake blocks completely with cast-iron blocks.