ICRI Workshop

Decreasing of derailments after gage face electronic lubricators installation

August 27, 2023, Rio de Janeiro

Adriano Magalhães Freitas

Railway Engineering Coordinator

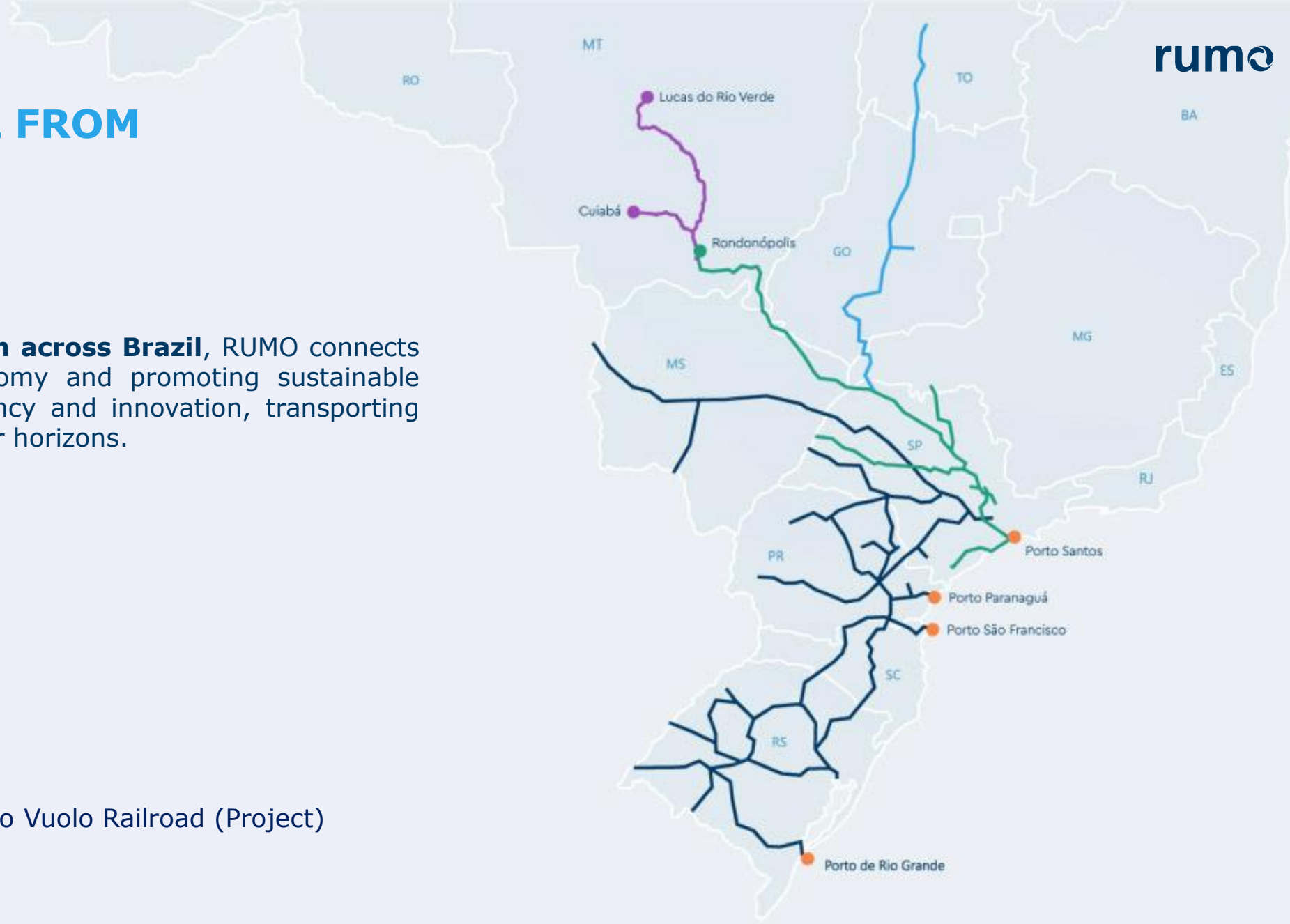
Rumo SA

adriano.freitas@rumolog.com

CROSSING BRAZIL FROM NORTH TO SOUTH

With **strong participation across Brazil**, RUMO connects cities, boosting the economy and promoting sustainable development. With efficiency and innovation, transporting products and dreams to far horizons.

- North Operation
- South Operation
- Central Operation
- Ports
- Senador Vicente Emílio Vuolo Railroad (Project)



rumo

13.470 km
network

35.000
wagons

1.500
locomotives

+8.000
employees

12
transshipment terminals

6
port terminals

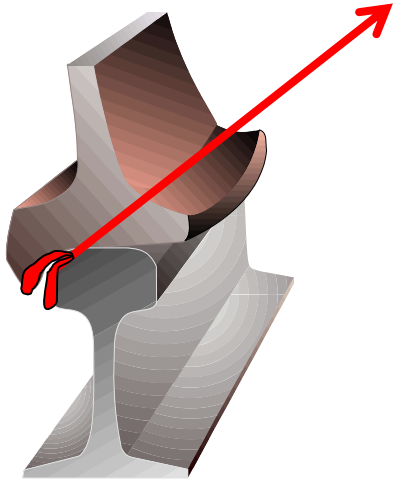
Decreasing of derailments after gage face electronic lubricators installation

SUMARY

Decreasing of derailments after gage face electronic lubricators installation

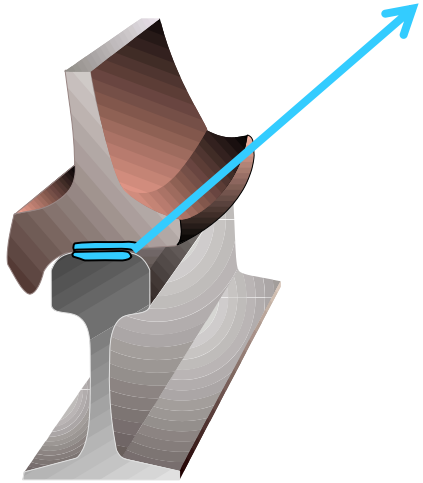
What is "friction management"?

It is the application of **lubricant on the rail gage face and/or friction modifier on the top of the rail** to keep the coefficients of friction at ideal levels to minimize wear, consequently increasing the rail's and wheels' lifetime.



gage face:

- Reduction of rail and wheel wear
- Improve energy efficiency
- Noise reduction
- Reduction of derailment risk
- Reduction of lateral force (indirectly)



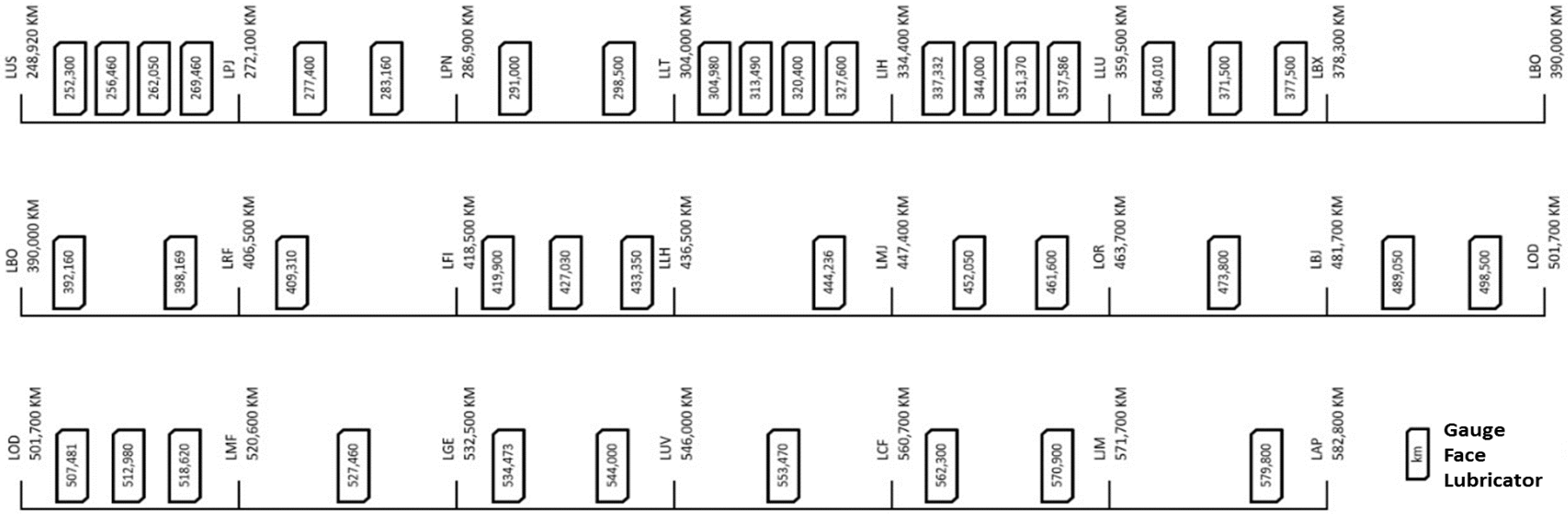
Top of rail:

- Corrugation reduction
- Noise reduction
- Reduction of rail and wheel wear
- Reduction of lateral force
- Less rolling contact fatigue
- Improve energy efficiency
- Reduction of derailment risk

Decreasing of derailments after gage face electronic lubricators installation

Overview

- The railroad section analyzed is located in the Rumo's South Operations, metric gage, 25 MGT per year
- 41 gage face electronic lubricators installed
- Typical train: 2 ES43BBi locomotives and 80 hopper wagons with 25 tons per axle capacity

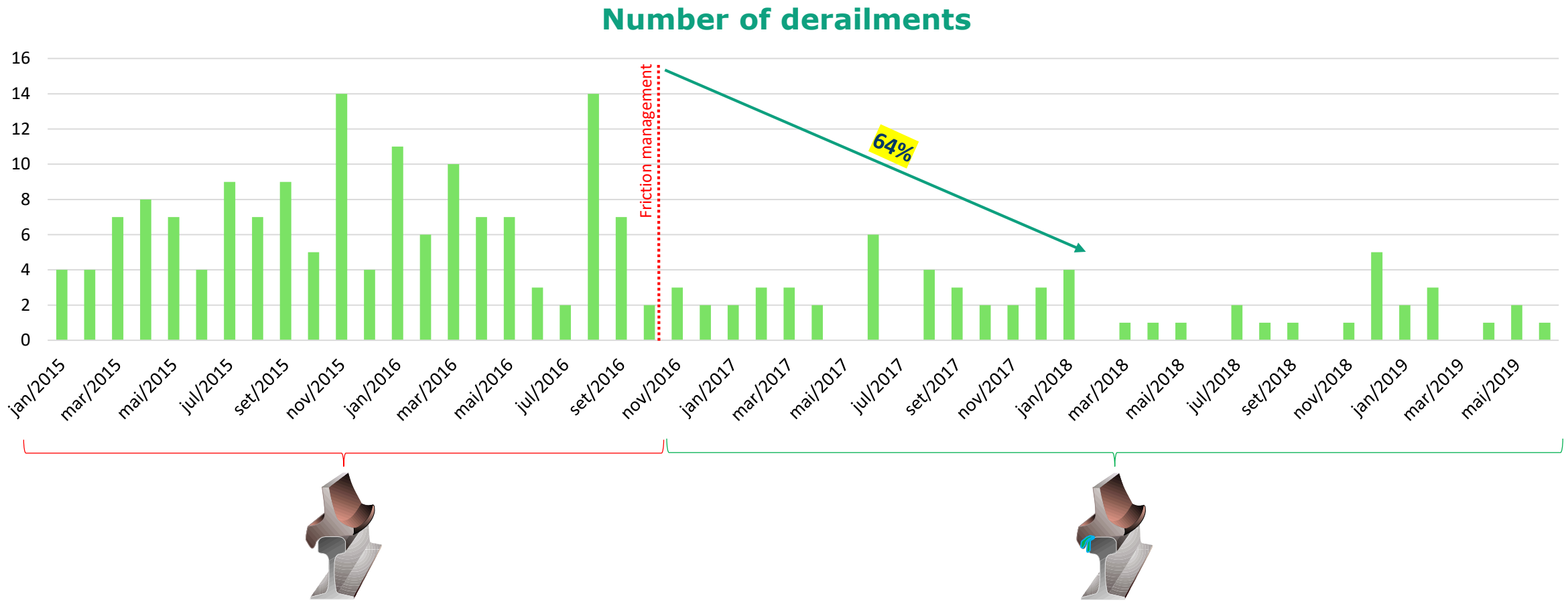


Decreasing of derailments after gage face electronic lubricators installation

Overview

Decreasing of derailments after gage face electronic lubricators installation

Derailment statistics

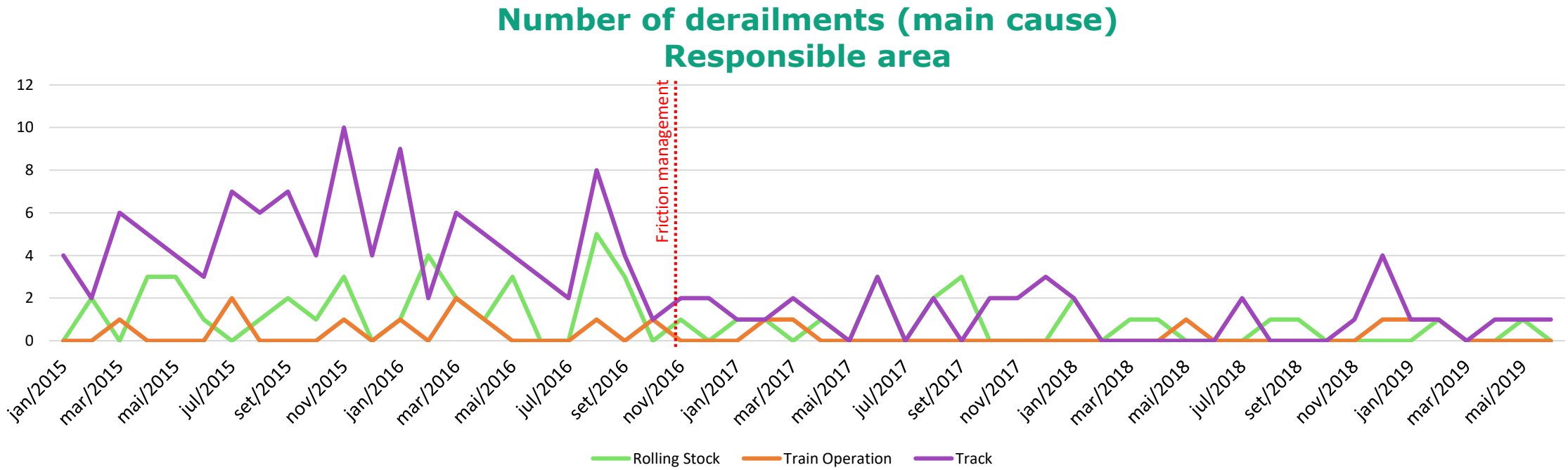


The global number of derailments **decreased 64%** in a 22-moth period

Decreasing of derailments after gage face electronic lubricators installation

Derailment statistics

- Could be only one specific cause be responsible for this decreasing?
- Was there any scenario change in only one sector?

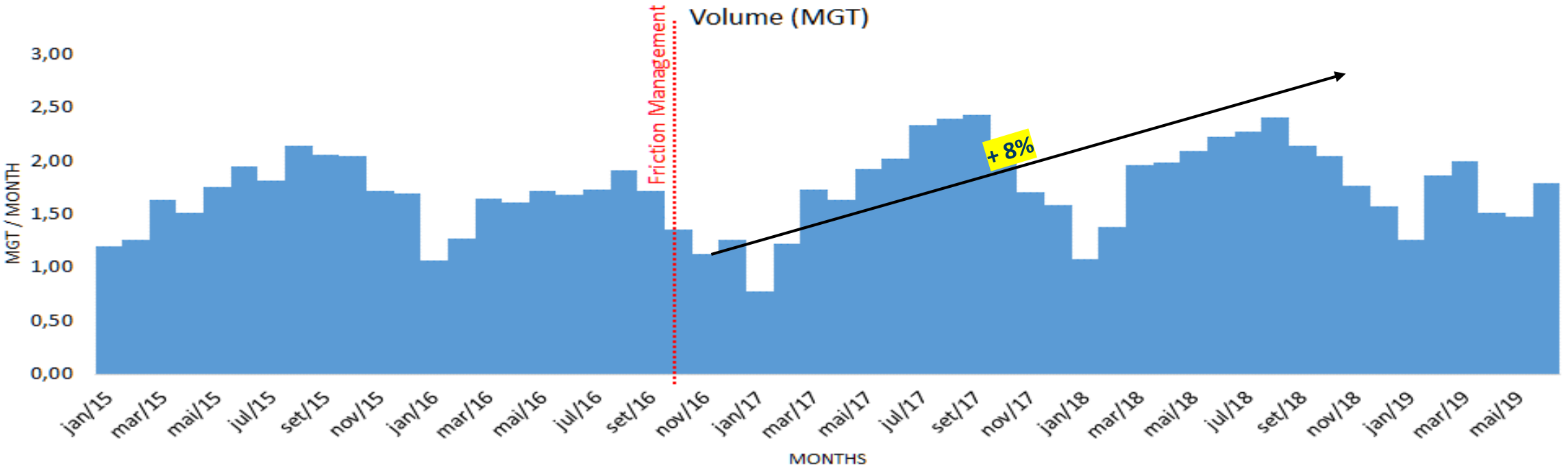


The analysis identified that the reduction of derailments was due a **common factor to all areas**.
In other words, there was no specific change in a specific area that promoted the reduction.

Decreasing of derailments after gage face electronic lubricators installation

Transport

- Could be the number of derailments decreased due less transportation?



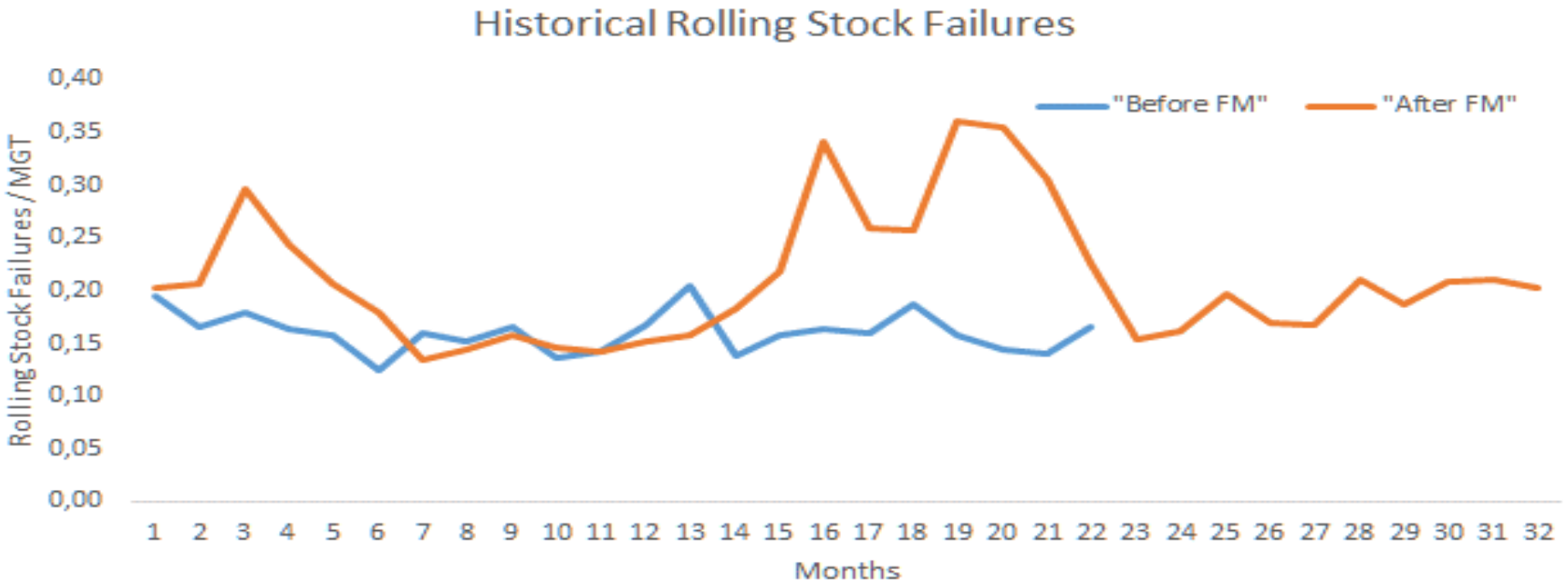
There was an increase in transport. This indicates a more accelerated degradation of the track components and rolling stock, **consequently increasing the probability of accidents.**

Therefore, the volume increasing made the scenario more difficult to reduce accidents, but **even on this conditions the number of derailments decreased.**

Decreasing of derailments after gage face electronic lubricators installation

Rolling stock conditions

- Could be the number of derailments decreased due rolling stock in better conditions?

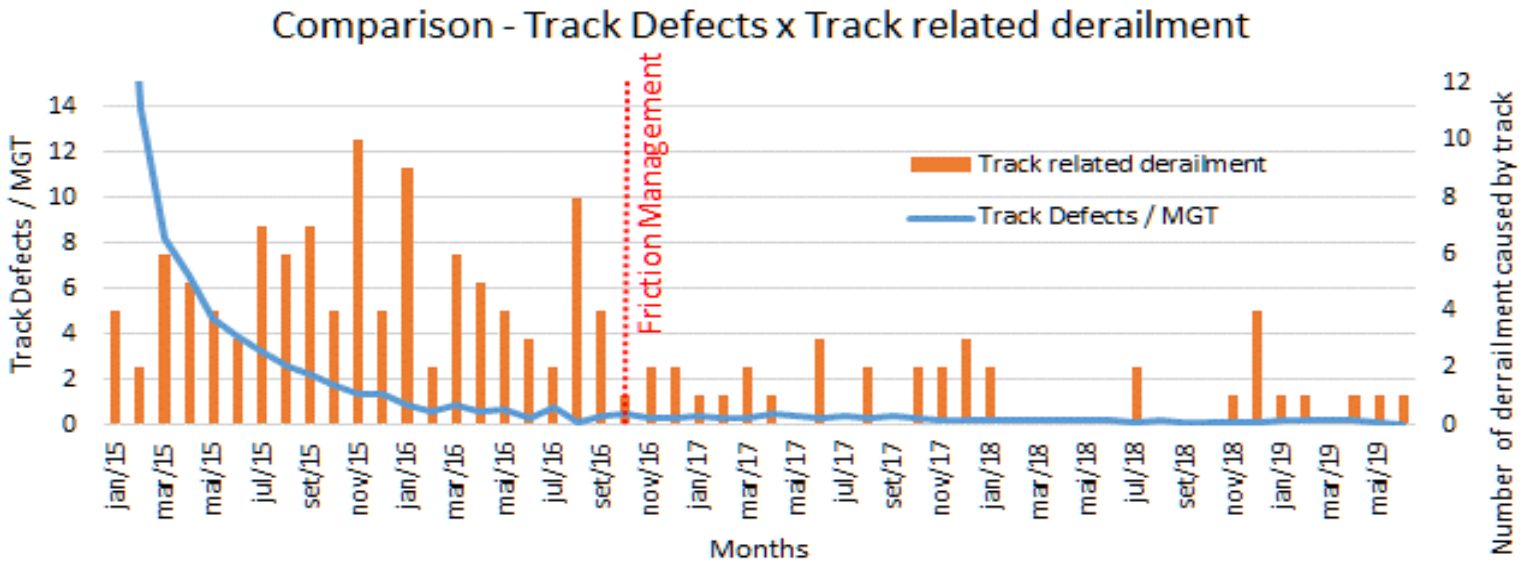


After the friction management equipment installation, the rolling stock has shown more number of failures, so **do not helped to decrease the derailments number**.

Decreasing of derailments after gage face electronic lubricators installation

Track conditions

- Could be the number of derailments decreased due track in better conditions?



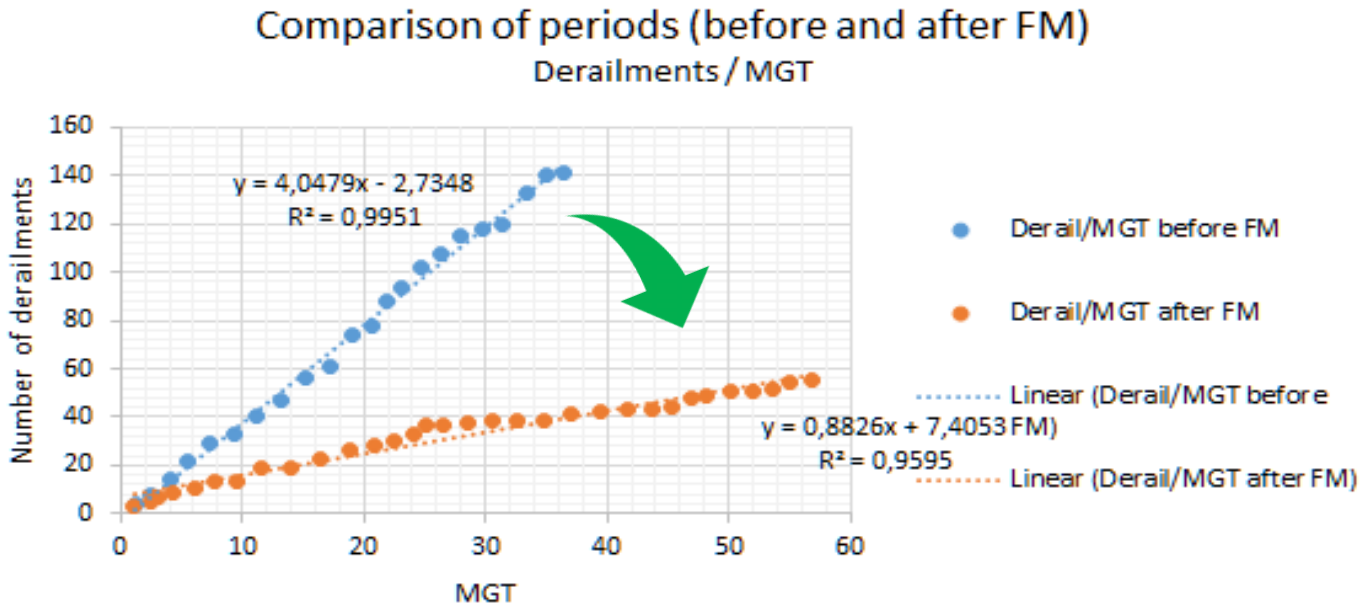
The track maintenance was intensified 10 months before friction management equipment installation, strongly reducing the geometry defects rate per MGT.

However the reduction of derailments caused by geometry defects was felt only after lubricators installation.

Decreasing of derailments after gage face electronic lubricators installation

Reduction in derailment rates

- How much did the friction management reduce in derailment rates?

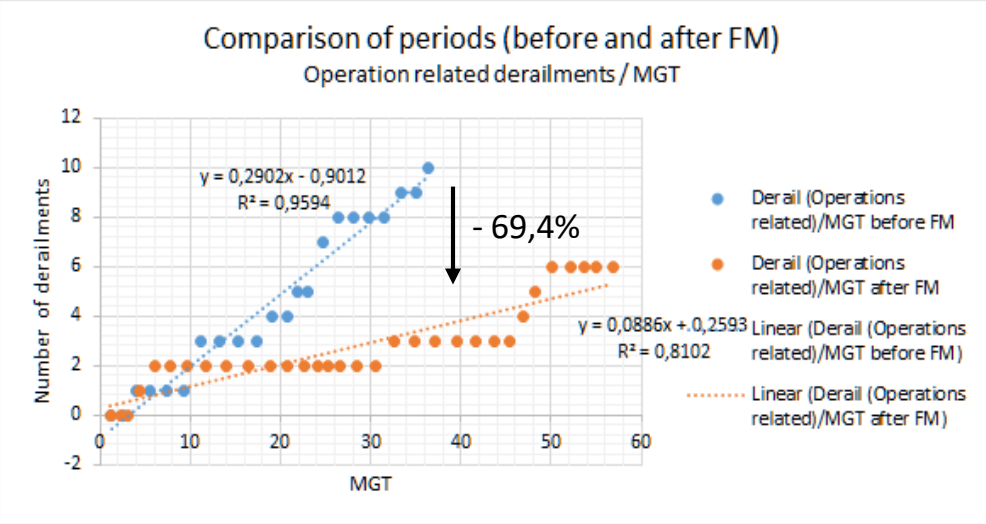


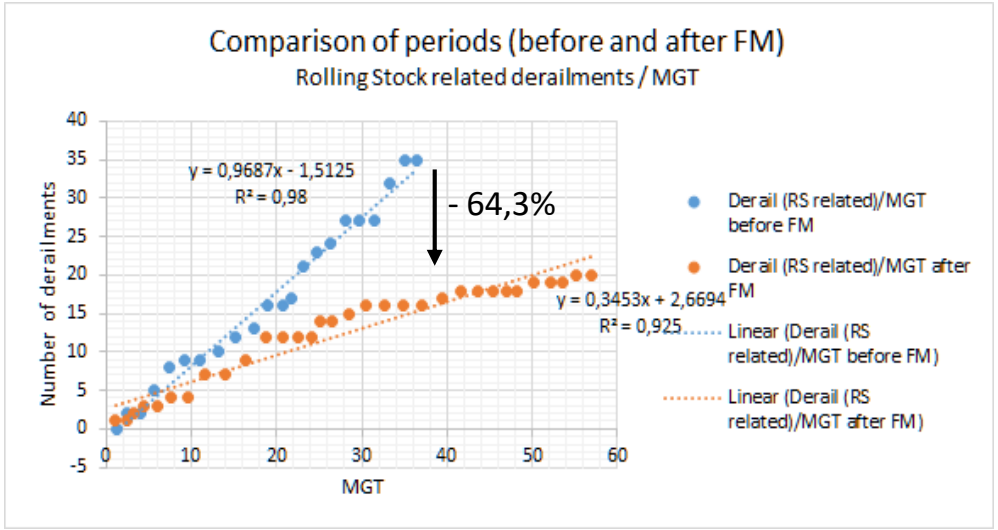
With friction management the number of derailments is shorter than without this equipment.

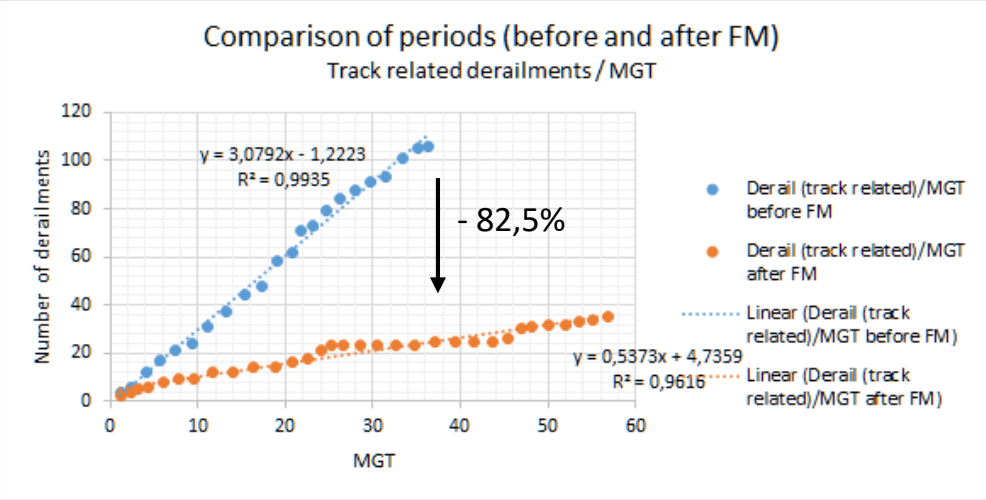
It was reached 78,2% reduction in derailments rate per MGT.

Decreasing of derailments after gage face electronic lubricators installation

Reduction in derailment rates







Every scenario analyzed has shown a significant reduction in derailment rates.

It was reached at least 60% reduction in derailments rate whatever the main cause.

Decreasing of derailments after gage face electronic lubricators installation

Conclusion

- The gage face friction management **increased train operation safety**
- With the implementation of gage face friction management, an **immediate reduction of 78,2% in railway accidents** was realized in 22-month period
- Gage face friction management is a fast and efficient alternative to reduce derailments **regardless the cause**


Thank you