

# **Progress Rail Inspection & Information Systems**

Train detection with combined  
intelligent Checkpoint



# Speaker:



## *Person:*

Michael Osterkamp  
Head of Sales for Inspection Products (EU)  
Progress Rail Germany

## *Experience:*

Working since more than 16 years in the railway sector. Worked as Project-, Product- and Sales Manager.

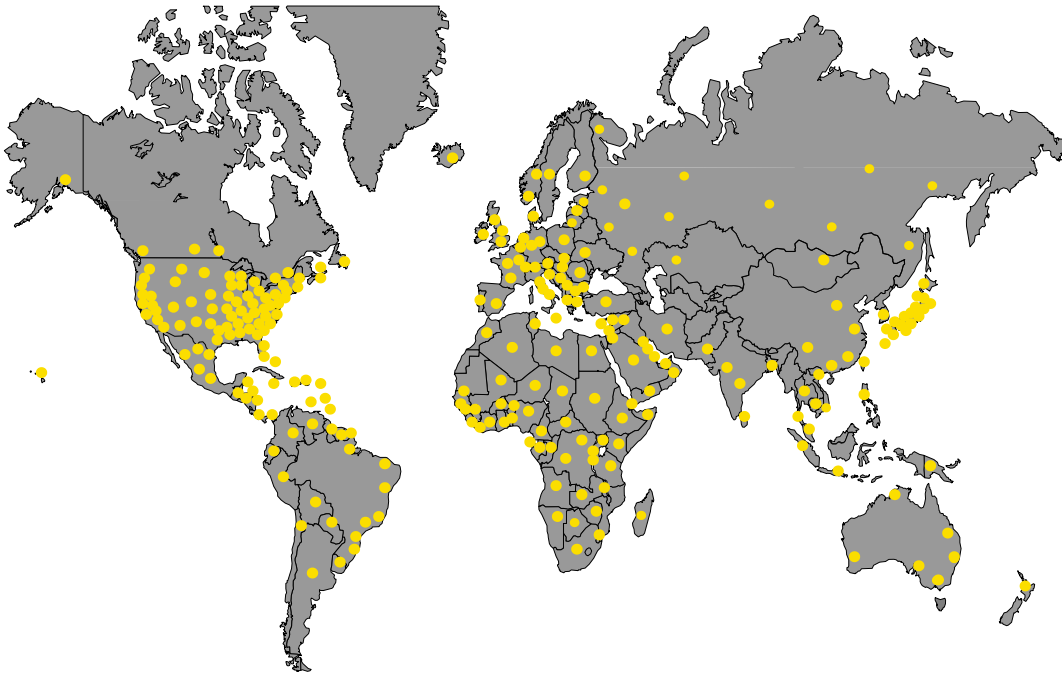
## *Today's Topic:*

### **Train detection with combined intelligent Checkpoint**

- Intelligent and Integrated Checkpoint,
- Efficient usage of Hardware and Software, based on integration concept
- Confirmed alarming considering various sensors

# Company

# CATERPILLAR®



- Progress Rail is 100% owned by Caterpillar
- Caterpillar has more than 100.000 employees
- at more than 278 locations
- distributed in 40 countries on 6 Continents

# Company



**Solar<sup>®</sup> Turbines**  
*A Caterpillar Company*



**Progress Rail**  
*A Caterpillar Company*

*Different Brands of Caterpillar, Progress Rail Service being the division  
Progress Rail Inspection & Information Systems is part of.*

# Checkpoint – Why is it needed?

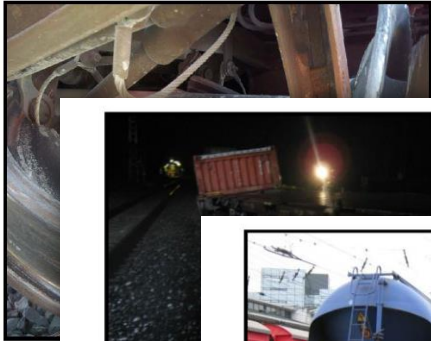


Abb. 1:

Ursache

Auf Grund der  
ungünstigen  
Lage der  
gleisseitigen  
des Gleises  
stellte sich  
genau dar.



Abb. 8: Zu

Ursachen

Die Entgleisung  
Radsatzlager



Abb. 17: Zugentgleisung in Hannover Hbf

**Ursache:**

Die Entgleisung des 21. Wagens wurde durch den Bruch des Achsschenkels an der ersten Radsatzwelle des vorderen Drehgestells in Fahrtrichtung rechts verursacht. Der Bruch war Folge einer thermischen Überbeanspruchung des Achsschenkels im Radsatzlager (Heißläufer).



Bundesministerium für Verkehr,  
Bau und Stadtentwicklung

Leitung der  
Eisenbahn-Unfalluntersuchungsstelle  
des Bundes

## Eisenbahn- Unfalluntersuchung

JAHRESBERICHT

**2012**



# Checkpoint – Why is it needed?



# Checkpoint – Why is it needed?





# Checkpoint – How was it done before?





# Checkpoint – How was it done before?



## Legacy Approach:

- Many individual and separated sensors are installed
- Demand for Space
- Demand for Integration
- Duplication of Hardware, track and wayside based
- Complex to maintain and expert & special skills are required, per system
- LCC and Spare Parts ...



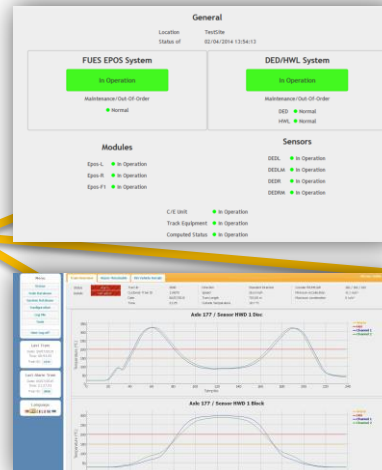
# Checkpoint – How is it done more efficient?



HBD – HWD (Type FUES EPOS)



WILD (Instant)



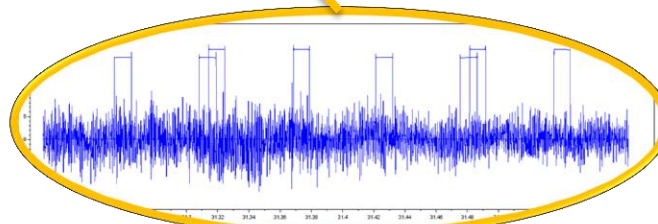
RFID, RHT, ...



Trainprofile (TIS - HWL)



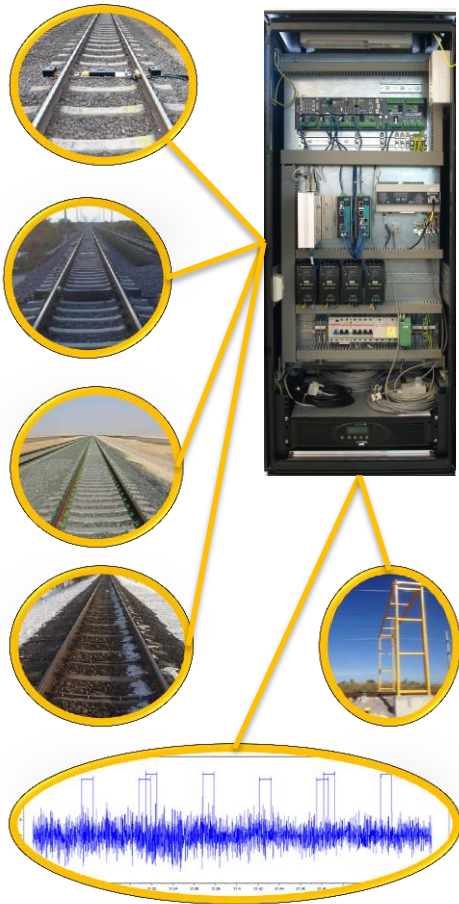
Dragging Detector (TIS - DED)



Acoustical Detection (TIS – ADD)



# Checkpoint – How is it done more efficient?

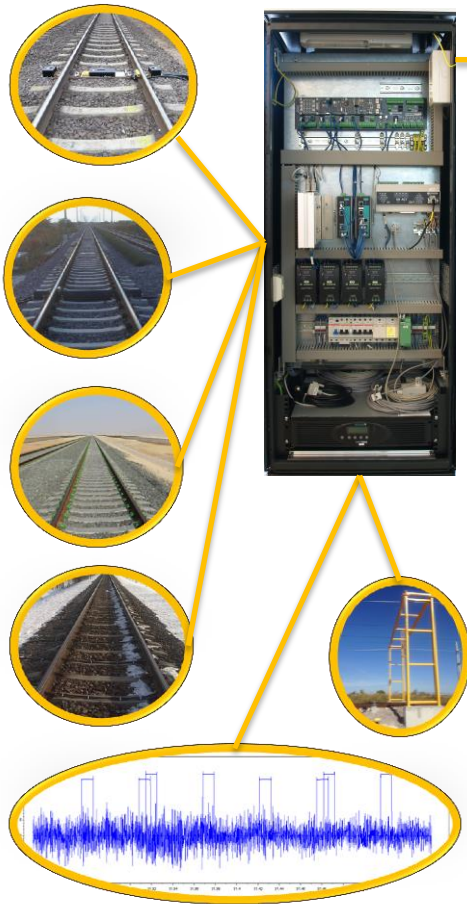


## Modern Approach:

- Integrating central unit, using the potentials of all installed sensors. Reducing Hardware (i.e. Wheel Sensors)
- The integrated central unit can even be placed in a single Outdoor Cabinet. Low requirement for space.
- The integration in any Office System is very easy to achieve. The integration is limited to one single checkpoint interface
- Easier and faster to maintain. Less components and the single system directly informs on the defect. Requires lower qualification level for maintainers.
- Protection of Investment, these System can easily be amended and extended.
- Less Parts, less Parts of the same type ... resulting a better LCC and lower Spares Inventory



# Checkpoint – How is it done more efficient?



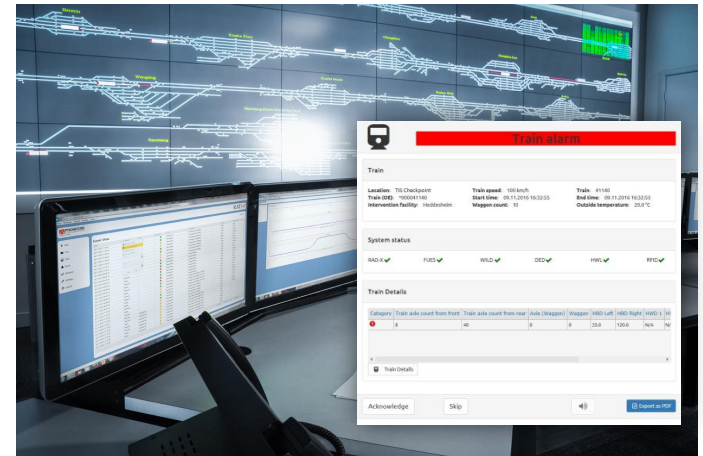
Telegramm (i.e. XML)



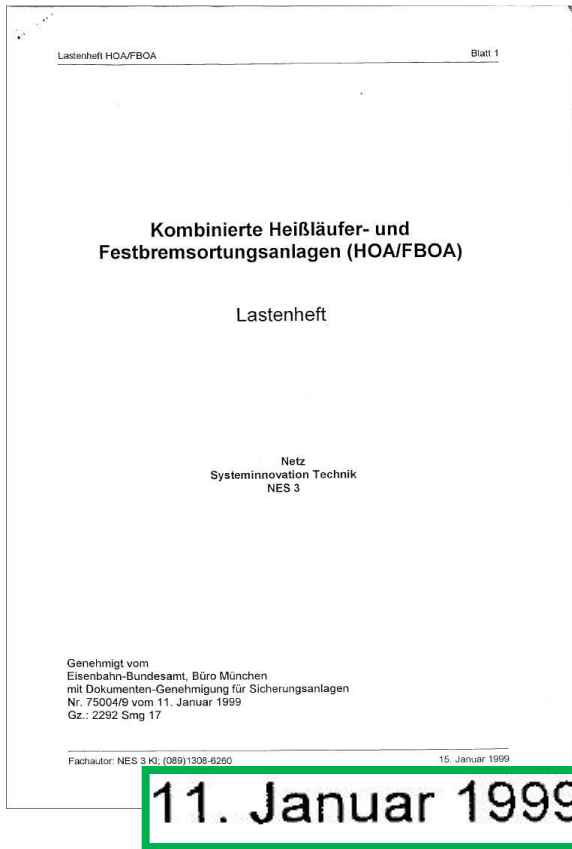
## Modern Approach:

- Using the possibility of combined data availability to introduce new alarms, like
  - Combined / confirmed alarms using different measurement technologies
  - Introduce preventive alarms, which are allowing a demand scheduled maintenance of rolling stock units
  - Intelligent alarm handling over the checkpoints, i.e. confirmed warning alarms
  - Reducing the impact of external influences
- Identifying rolling stock units that not yet caused alarms, but have different measurement profile
- Reduce the efforts for calibration, adjustment and positioning to the minimum. The infrastructure is intended for trains and not for repair activities
- Record Life Cycle data to understand the performance of the system(s) installed.
- New innovative predictive features, we call them “Silent Alarms”

# Measurement Principle?

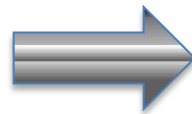


# Checkpoint – What are the constraints?



## Possible Constraints:

- Specification documentation is not at the same level as technology.
- Required approvals can not be granted, based on missing modern specifications and requirements.
- Operating concept and working principles are not supporting new system concepts.
- Infrastructure is not ready for the newer technology



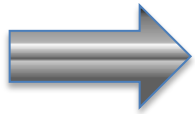
Good News is: More and more railways are addressing these concerns and remove those constraints. It will take time ...



# Checkpoint – What are the constraints?

Possible Constraints:

- Different Interest Groups, Infrastructure Manager & Railway Undertaker.
  - Budget (Investment)
  - Data (Sharing)
  - Ownership (Maintenance & Support)
- WTMS is not always on the top of the agenda.



The awareness is increasing and budgetary constraints could also push newer and more efficient technologies in the railway market

# Checkpoint – Is it safer?

Statement: Railway undertaking is safe + secure!

While most railways are concerned on the costs of the railway undertaking. Especially considering the growing competition, is the challenge:

*“Make railway undertaking more cost efficient, while ensuring the same level of safety + security.”*

Concluding: Is the key to collect more data, with less systems and make the data usable for statistical and other analysis, supporting predictive and preventive maintenance.

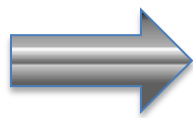
# Checkpoint – What has to be done?

- The IT infrastructure must be ready to support such Checkpoints.
- Potentially: Teams have to be assigned and trained. Working instructions to be updated and awareness needs to be raised.
- Awareness among the infrastructure owners has to be raised, demonstrating the reasons to support this concepts.
- Back office and Dispatcher Systems, may need to be updated...



# Old Style Monitoring

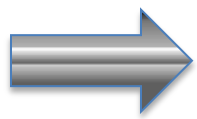
One of our legacy office system (currently used)



***Display System for HABD field systems. Only supporting limited amount of systems.***

# Modern Monitoring

## Example our office system



***Changing from monitoring of single System towards  
Train Monitoring***

# Modern Monitoring

## Example our office system



- Reporting based on Train Analysis
  - Showing a complete Train Analysis
  - Not limited on single Checkpoint
  - Active intelligent interface between and combining Checkpoints
  - “Silent Alarms” supporting predictive and preventive maintenance
- Trending (development of problems)
- Flexibility related to the individual user requirements.
- Data management
  - Train related data
  - System related data
  - Other variation and combinations (like regions)
- Statistical Analysis
- Maintenance Recommendation
- All core functions are embedded
  - Train alarms are treated and user actions are documented
  - All connected System statuses are monitored and any chances documented and reported
  - Allows the usage of the collected data, for preventive and predictive maintenance diagnostics
  - Can be cascaded by region and national level
  - Multilanguage and potential of growth integrated



# Conclusion

## Train detection with combined intelligent Checkpoints

- Is train detection with combined intelligent Checkpoints a positive step forward?

Yes

- It is changing the reporting towards Train Alarms, using various measuring sensors
- Alarms can be based on different sensors (Temperature and Acoustical) , ensuring the confidence
- It allows the possibility to change from reactive to preventive maintenance, i.e. acoustical detection
- It is one step to make “big data” handling easier, by combining and tagging data
- It allows monitoring the trains, wagons and boogies through their life span, i.e. Office System
- It is not only reducing the maintenance costs of the Checkpoint itself (LCC), but beyond
- Reduces the costs for Railway Undertaking, based on preventive features (Bearing diagnosis).  
Allows a better planning in the repair shops, to prolong the time between visits and reducing the amount of alarms during operation.

Many thanks for your interest

Vielen Dank

