



RailSafety Summit

2017

Freight Wagon Maintenance and Loading Regimes

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Freight wagon maintenance and loading regimes

- Private Wagon Maintenance
Managing safety accountability when your business is not about operating a railway
- Managing the risks of uneven wagon loading (asymmetric loading)
Application of technology to detect uneven loading

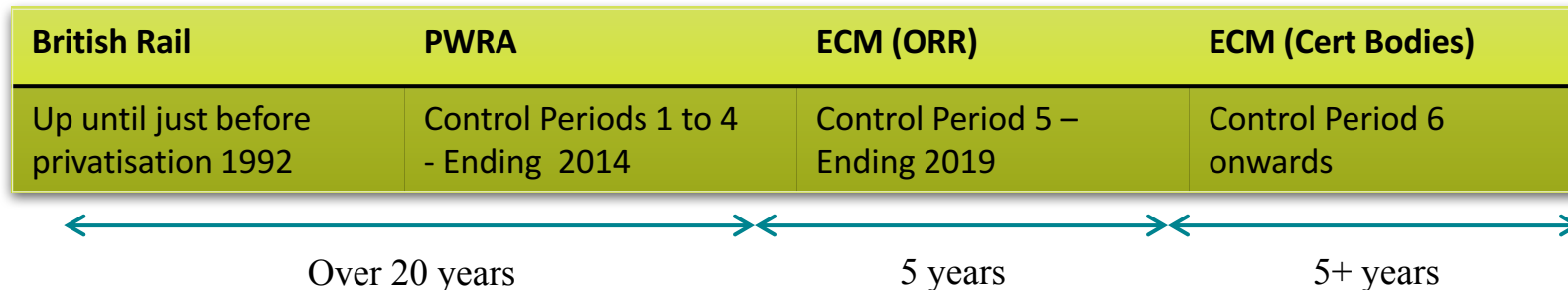


Wagon Maintenance – Privately Owned Wagons

The four ‘ages’ of wagon maintenance for privately owned wagons

- British Rail
- Private Wagon Registration Agreement (PWRA)
- Entities in Charge of Maintenance (ORR certification)
- Entities in Charge of Maintenance (ECM Certification Bodies)

The timelines



Wagon Maintenance – Privately Owned Wagons



The Fleets

- Over 3,000 vehicles.
- Both bogie and two-axle wagons - oldest dating back to the early 1960s.
- Wide variety of wagon types - container flats, hoppers, boxes, tanks and other specialised wagons (e.g. Autoballasters).
- Majority of Dangerous Goods traffic was covered by the PWRA.



Private Wagon Age	British Rail	PWRA	ECM (ORR)	ECM (Cert Bodies)
Timeline	Up until just before privatisation 1992	Control Periods 1 to 4 - Ending 2014	Control Period 5 – Ending 2019	Control Period 6 onwards
Wagon Safety: design, construction, maintenance etc				
Monitoring safety performance				
Assurance (certification)				
Operation				
Funding (Safety)				

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Monitoring safety performance	British Rail	Strategic Rail Authority (SRA) then Railtrack / Network Rail		
Assurance (certification)	British Rail	Railtrack / Network Rail (VAB)		
Operation	British Rail	Freight Operating Company (FOC)		
Funding (Safety)	British Rail	Strategic Rail Authority (SRA) then ORR (determination)		

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Assurance (certification)	British Rail	Railtrack / Network Rail (VAB)	ORR	
Operation	British Rail	Freight Operating Company (FOC)	FOC	
Funding (Safety)	British Rail	Strategic Rail Authority (SRA) then ORR (determination)	ORR Certification and Engineering Service Provision (ESPA)	

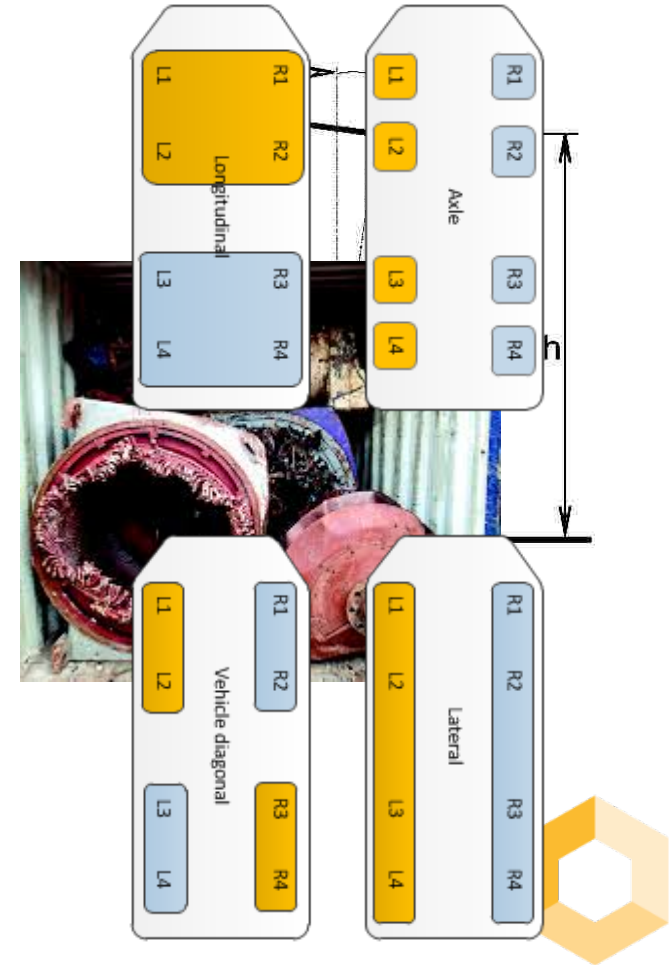
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Assurance (certification)	British Rail	Railtrack / Network Rail (VAB)	ORR	ECM Certification Body
Operation	British Rail	Freight Operating Company (FOC)	FOC	FOC
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Wagons	Cicra 3,000	Cicra 3,000	Cicra 3,000	?????
Organisations	17 Private Owning groups	17 Private Owning groups	8 ECMs	? ECMs



Asymmetric Loading

- Definition:
 - not identical on both sides of a central line
 - unsymmetrical
 - lacking symmetry
- How it happens:
 - Maintenance
 - Suspension set-up
 - Frame twist
 - Loading
 - Loading equipment
 - Operations (what's inside?)



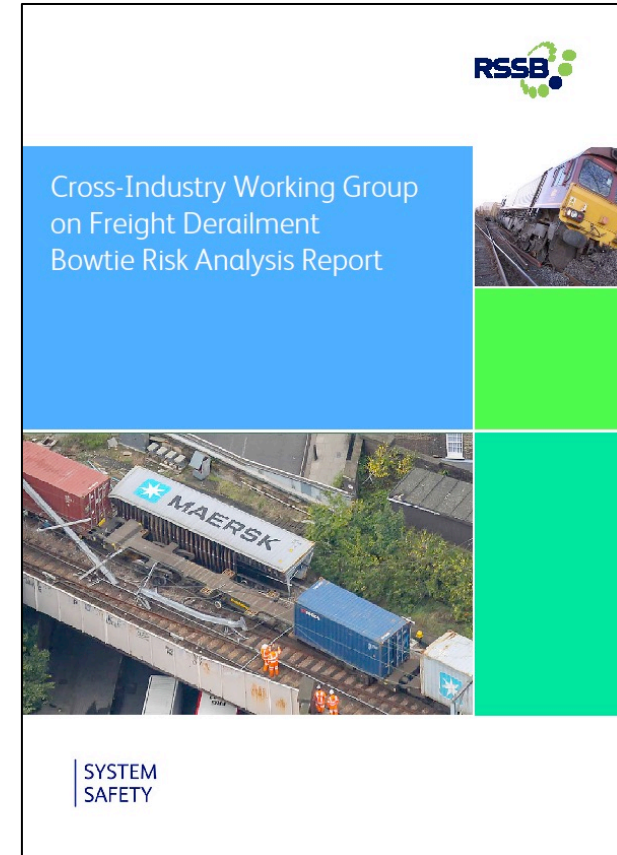
Asymmetric Loading – the risk to safety



Asymmetric Loading – Cross-Industry Working Group on Freight Derailment

December 2014, ORR invited the infrastructure manager and the freight industry to work together with RSSB and others, to:

- Define the current track, vehicle and load system
- Define how these three elements interact
- Describe the current risk controls in place
- Detail the gaps in those risk control systems
- Specify the measures required in the short, medium and long term to reduce those risk gaps so far as is reasonably practicable
- Implement those measures



Asymmetric Loading – measuring it

- Network Rail operate a series of Wheel Impact Load Detectors (Gotcha) to identify vehicles with wheel flats or out-of-round wheels (which can cause broken rails or track damage).



Asymmetric Loading – Off-Line Gotcha (trending of wagon twist and off-set loads)

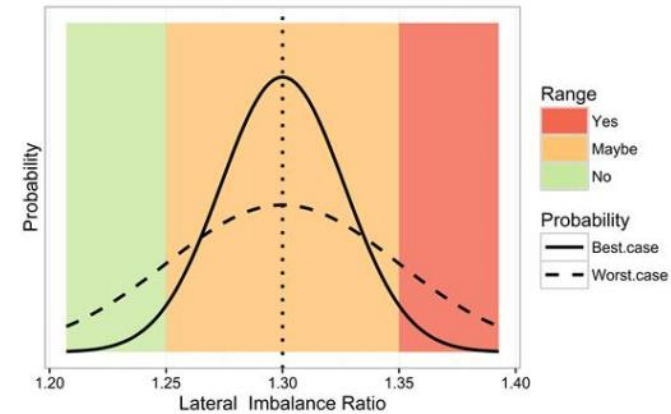
- The system being measured (track/ train) has inherent variability
- Repeatability for asymmetric loading is a challenge

But.....

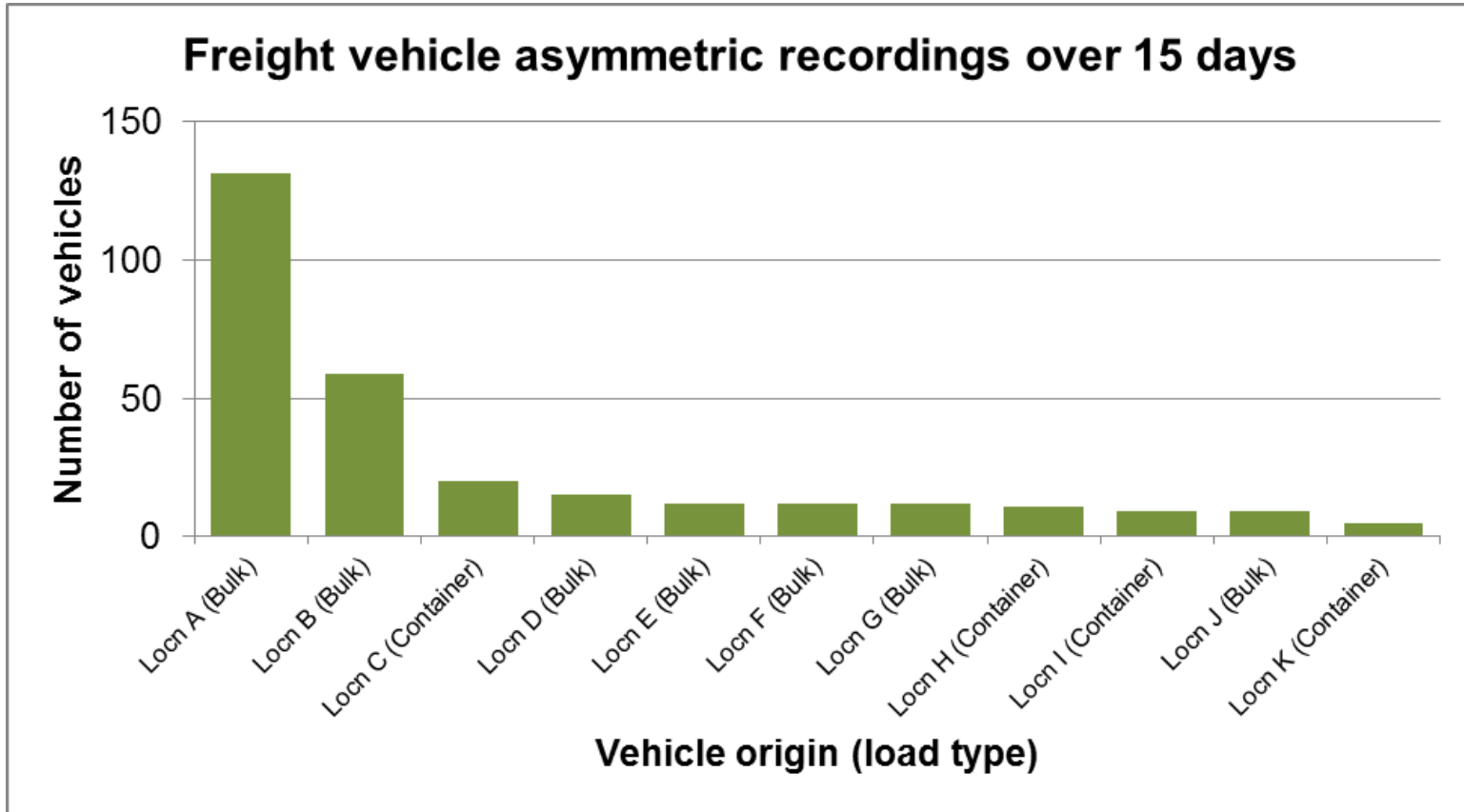
Working with the freight industry, ORR and RSSB
Data analysis has provided categories we can work with:

Is the UIC General Conditions of Use asymmetry limit exceeded?:

- Yes
- No
- Maybe – falls into an indeterminate range



Asymmetric Loading – Off-Line Gotcha (trending of wagon twist and off-set loads)



Private wagon maintenance and asymmetric loading – closing the loop

- The PWRA was created to enable commodity movers to switch to rail
Managing safety accountability when your business is not about operating a railway
- Safety legislation is filling in the gaps for wagon safety responsibility
- Safety accountability in the private wagon market is maturing
- Asymmetric loading as a causal factor in freight derailments is a risk
Risk controls are being developed
- Our mission (the rail industry): Maintain the balance by working together



One vision for the future - Condition Monitoring ‘Supersites’

Vehicle Identification (tags and readers)

Impact/Load (defects and asymmetric Loading)

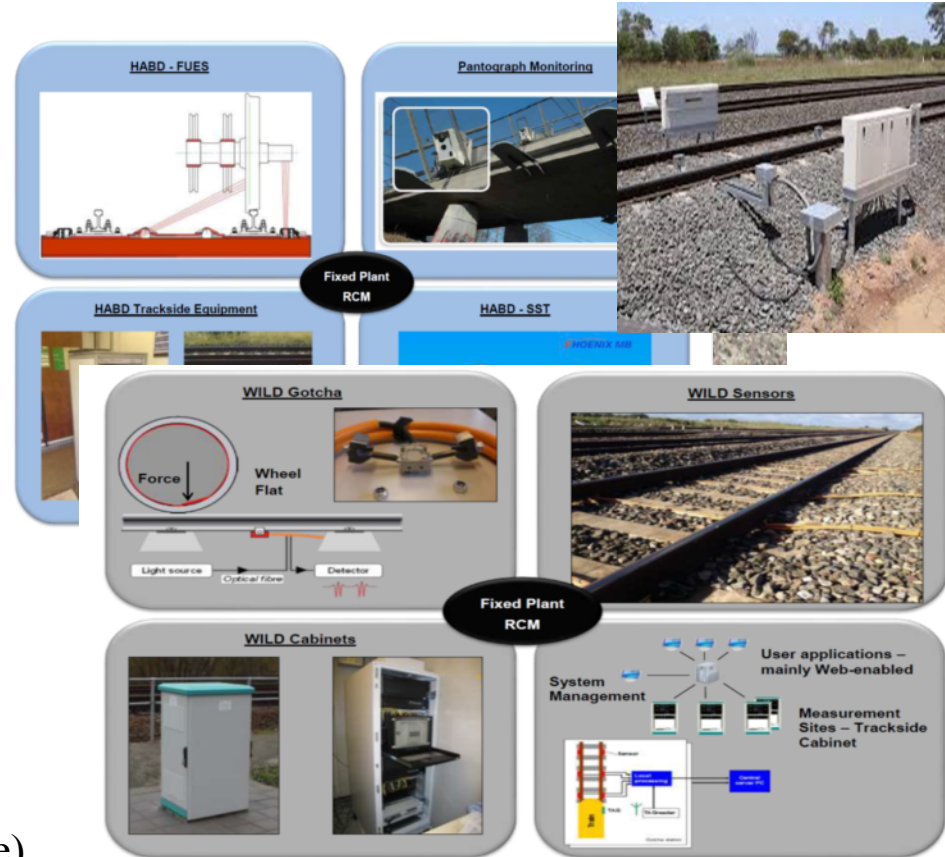
Acoustics

- Wheelsets (defect, ovality, bearings)
- Engines (journal bearing, transmission)
- Noise (neighbours)

Optical / Digital imagery

- Wagon interior (asymmetric loading)
- Wheel profile
- Suspension
- Brake pads
- Bearings and end cap
- Brake beam, in development
- Coupling components, in development
- Springs, in development
- Adjacent line 3-D pantograph, in development

Thermal (imminent wheel bearing defects & failure)



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Thank You