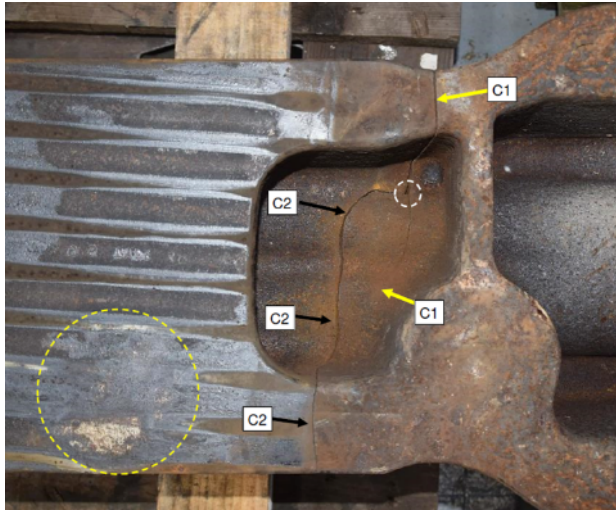


PWI Winter Seminar

Crossings

Bleddyn-James Davies

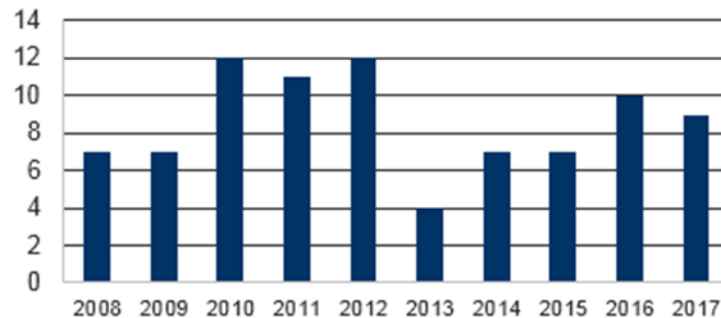
Crossings – the challenge ahead



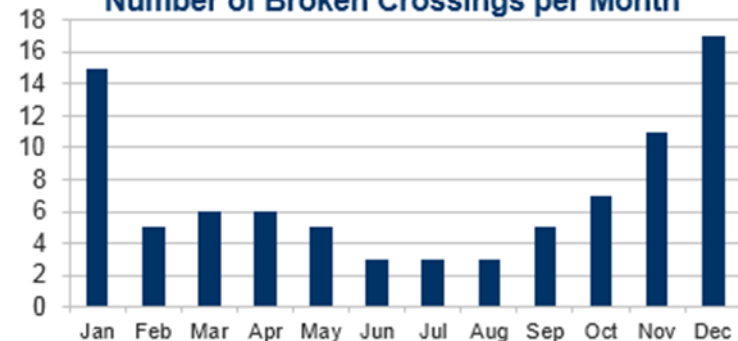
(a)



Number of Broken Crossings per Year

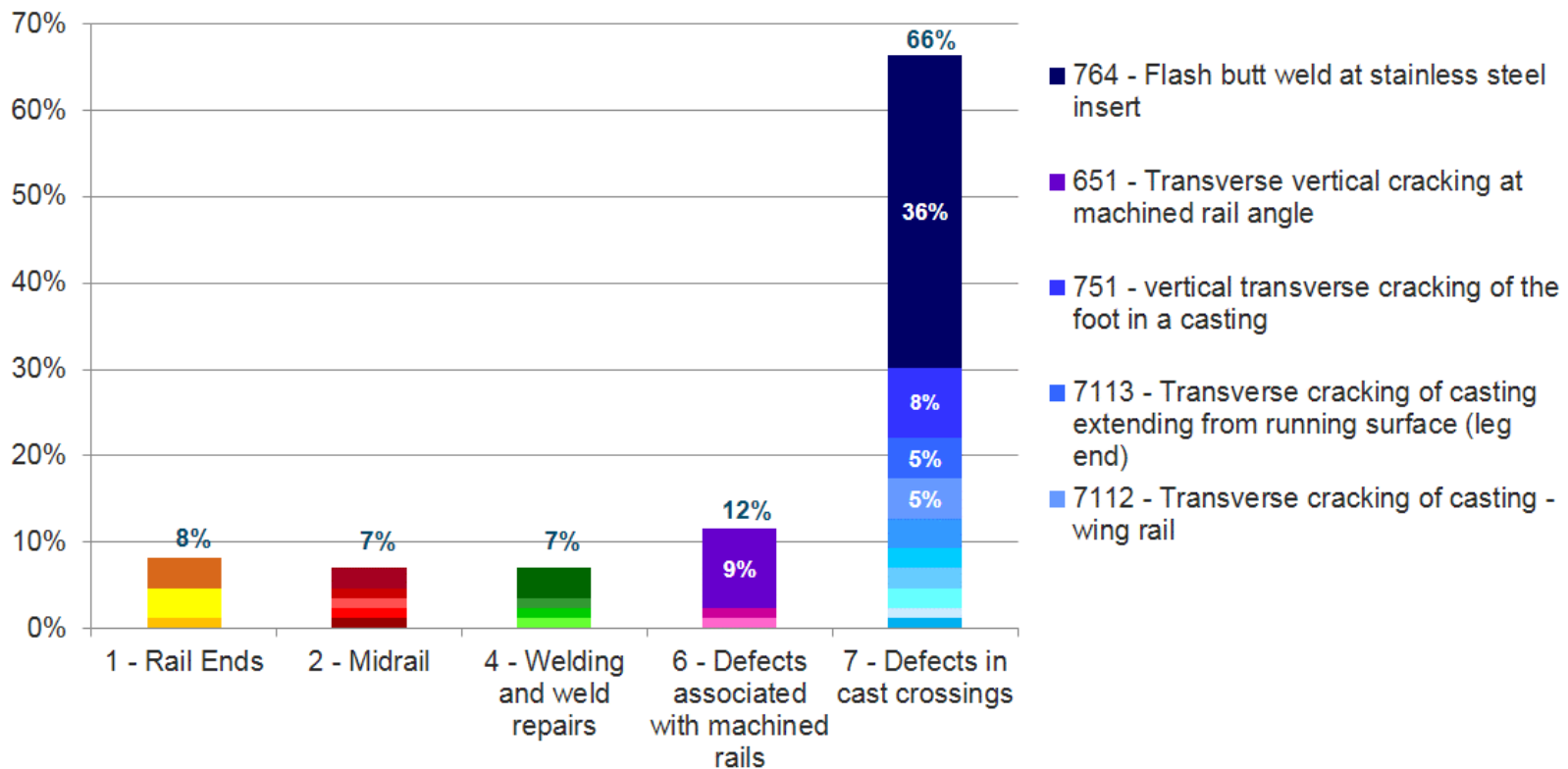


Number of Broken Crossings per Month



Data review – RDMS 2008 to 2018 - Kauser Ismailjee

The top 5 defects in broken crossings, classified according to UIC Rail Failure Classification System are highlighted in the graph. **36% of defects occur at the 'flash butt weld at stainless steel insert'**



More specific data – intelligence

More than just a photograph of the defect...qualitative data required

General Information	
Points Number	WM2582B
ELR	LEC1
Track ID	1100
Mileage	17m100y
Track Category	1A
Line Speed	110mph
RDMS Ref. No.	2684710
Defect Description	7111 – Transverse Cracking on Crossing Vee (See attached TEF3037 Forms).
Defect MAC	YOH
Extra Information	
Date Installed	06/06/2016
Date of last inspection	14/6/18. Next Planned 15/6/18 (Daily inspection)
TEF3031 – with a list of findings	See Attached TEF3031 PDF forms
Manufacturer / casting number / date on casting	Progress Rail / 761219 / 06 14
Photograph of defect (Close and Wide views)	Included in email
Dip angle measured during latest NMT run	Approx. 12mRad
Annual tonnage	42.50
Any change of traffic type / frequency in the last 12 months	N/A
Date of most recent mechanised track maintenance	Around 2014 as part of WARP Project
Was the crossing re-profiled via hand grinding within 6 months of initial installation?	No Records stating this was carried out

General Information	
Points Number	734
ELR	BML1
Track ID	1100
Mileage	7m 242y
Track Category	Cat 1
Line Speed	75mph
RDMS Ref. No.	N/A
Defect Description	N/A
Defect MAC	N/A
Extra Information	
Date Installed	2015
Date of last inspection	06/06/2018
TEF3031 – with a list of findings	
Manufacturer / casting number / date on casting	Edgar Allen / 562615-2733 04/2012
Photograph of defect (Close and Wide views)	Attached
Dip angle measured during latest NMT run	34
Annual tonnage	46 EMGTPA
Any change of traffic type / frequency in the last 12 months	N/A
Date of most recent mechanised track maintenance	MPSB Week 52 2018
Was the crossing re-profiled via hand grinding within 6 months of initial installation?	04/09/2018 24.36 / 30/10/2018 35.08

The challenge – improve crossing performance

Why do crossings fail?

- Track bed quality
- Lack of maintenance
- Competency and confidence
- Increase in train frequency / tonnage
- Design issues
- Access constraints (frequency & time)
- Flaw in casting / repairs
- Crossing not ground post installation

Conclusion

Many causal factors so the challenge is to address each one and **make the crossing more resilient**

Crossing Specification

Align the specification to the future needs of the asset

Product Acceptance Process

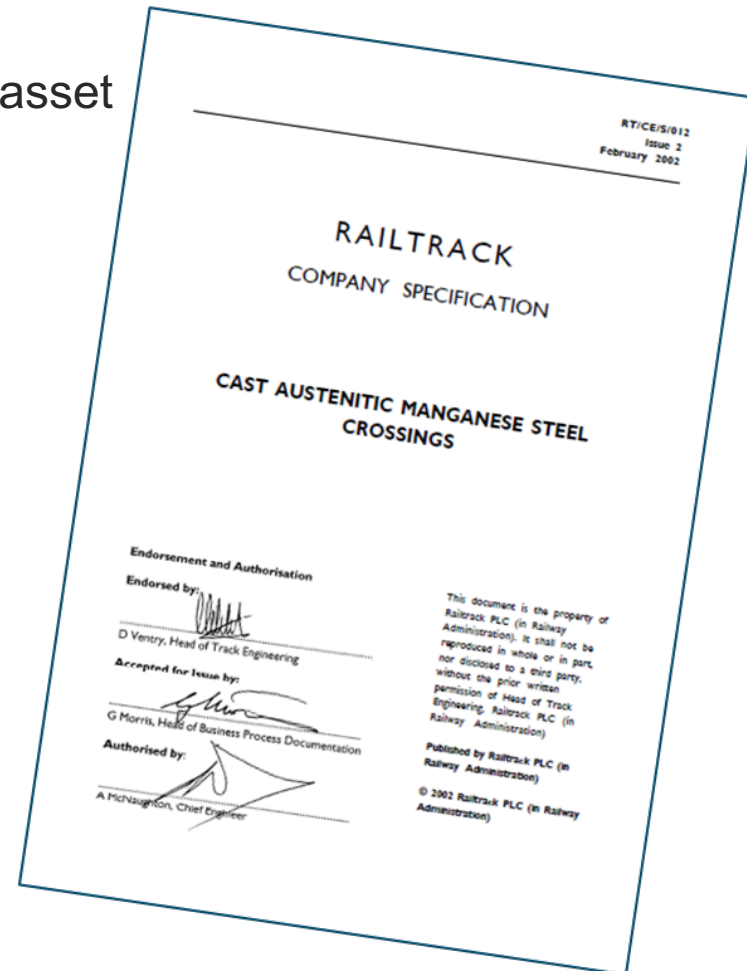
DFR

CSM-RA

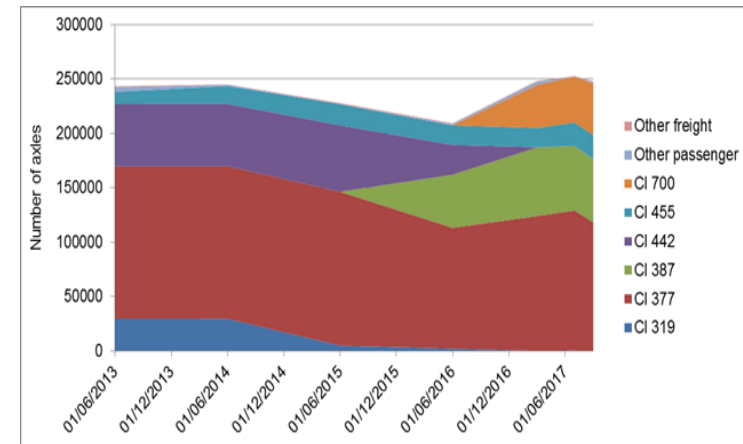
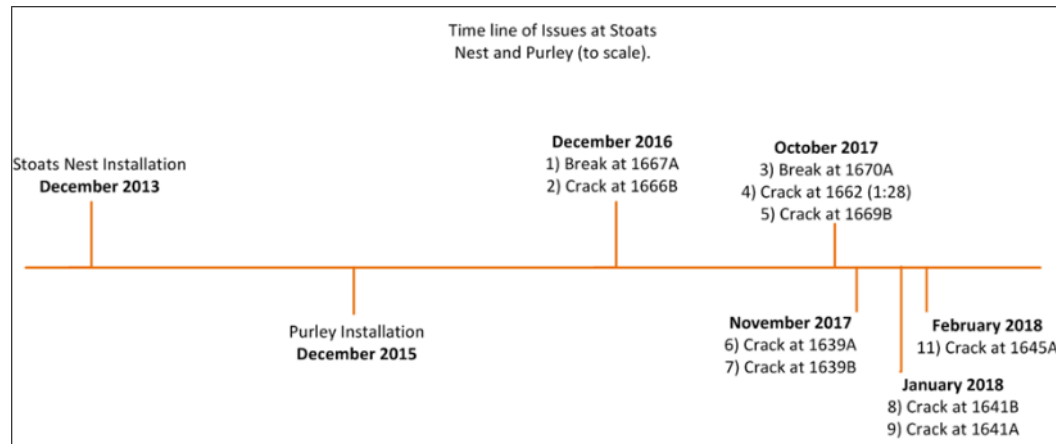
Clarify the Specification

Improve Crossing Production Processes

Fatigue life evaluation and structural integrity



Stoats Nest & Purley 1:13 issues



				Trains a year	Axles (40 per train)	Tonnage (20 tonne per axle)	MGT	Expected life
Weekday	260	5	52	67600				design life / yearly tonnage.
Sat	243	1	52	12636				
Sun	150	1	52	7800				
Total				88036	3521440	70683047.97	70.68305	7.073831907

Conclusion

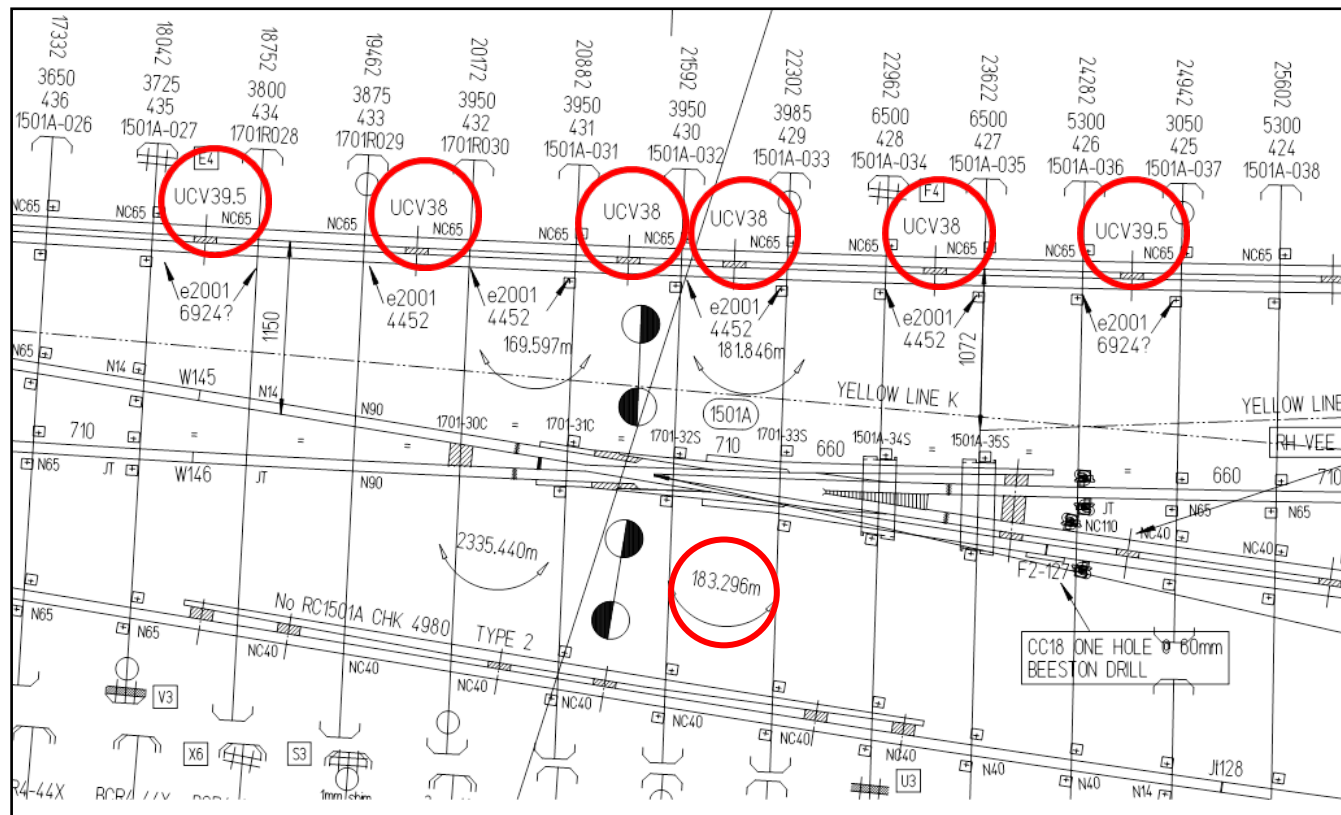
Combination of linespeed (90mph) and tonnage (70MGT) exposed a weakness with a specific 1:13 design of crossing.

Action

Publication of NR/SIN/183 to control risk.

Waterloo – S&C as a system

Tightly curved S&C remodelled in August 2017



Waterloo – S&C as a system

Interim solution

Change 1391mm check gauge to 1394mm

Longer term proposal

Change NR56V gauge to 1435mm / 1394mm

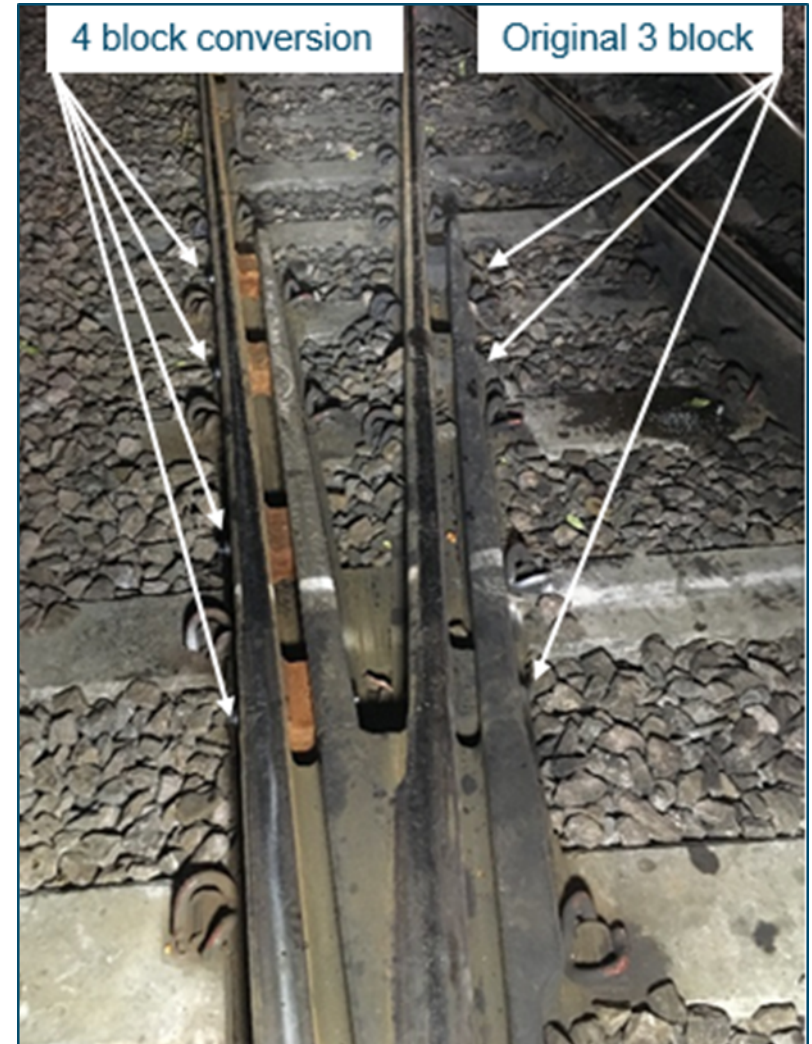
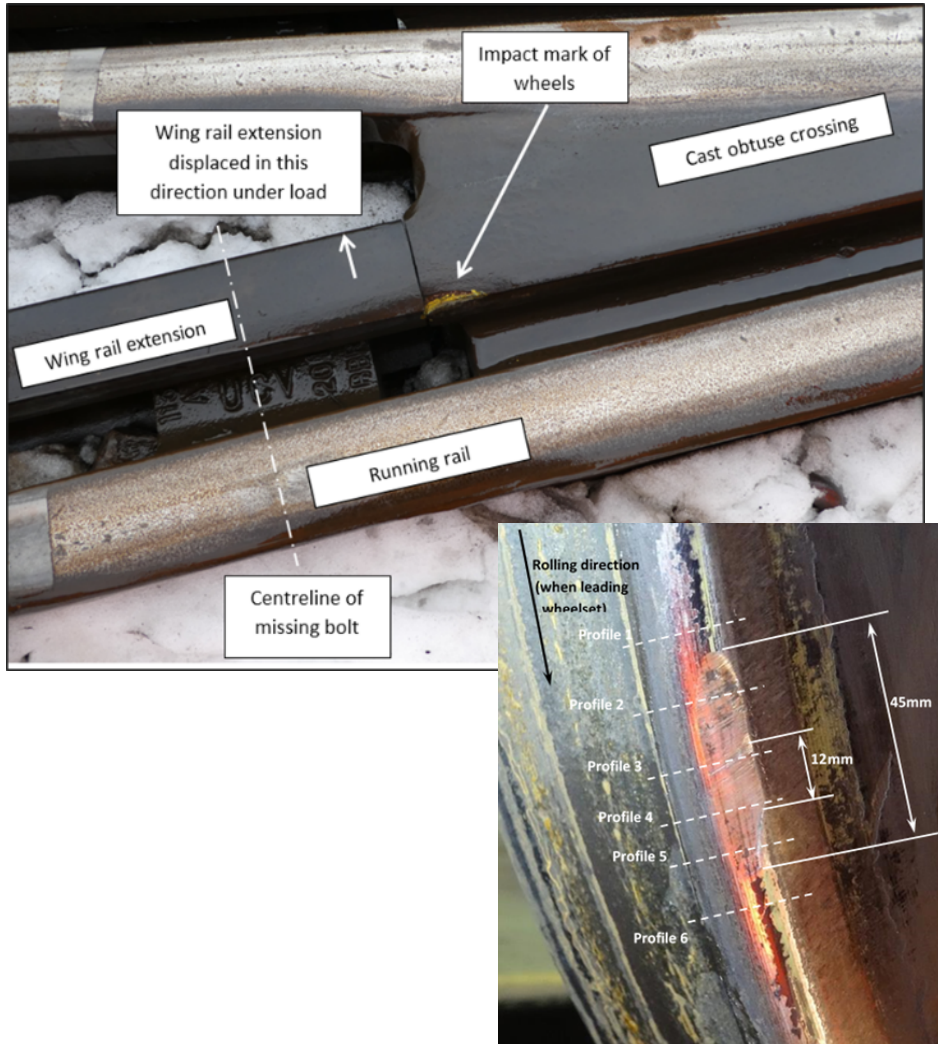
Change bearer spacing at crossing to 650mm

In essence, move towards NR56 Mk2 design

NR60 Mk2 success

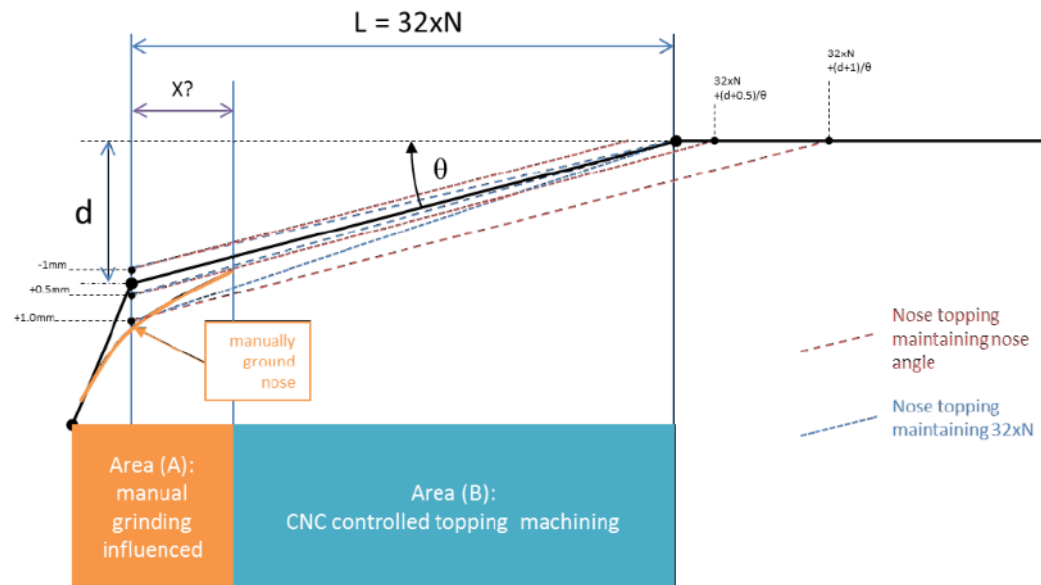


Maindee – asset resilience



Working with Huddersfield University

R&D funding to explore options and optimise wheel rail interface
Estimated £24m a year on crossings (replacement and delay penalties)



To summarise – Track is complex!

What does 2019 have in store....

Publication of NR/L2/TRK/012 – New Specification

R&D outputs – Optimised NR56 & NR60 topping designs RE/PW

Technical Authority – BAU support to Routes

Agree the principles and strategy for NR56V – Next generation

Support future improvement initiatives – Dynamic impact via SMS

Thanks for your time.....