A Day in the Life – Scotland's Maintenance Challenge

Presentation for PWI – 17th September 2025

Photo Credit: Stuart Russell, PTO Glasgow Central

Contents

1 – Career Overview

2010 – 2013

- **Graduate Engineer**
- Introductory placements in York, Leeds and Hull
- Placement within Edinburgh Waverley Refurbishment project team
- Placement on site on Glasgow Central Platform Refurbishment project
- Placement in Glasgow Maintenance Delivery Unit as Performance and Assurance Engineer

2013 – 2016

- **Assistant Track Maintenance Engineer (Glasgow Central)**
- Glasgow Central High Level and suburban network across South of Glasgow
- Dense S&C, mostly low-medium speed suburban railway
- Achieved Chartered Civil Engineer status in 2015

2016 – 2019

- **Track Maintenance Engineer (Edinburgh)**
- Large area stretching from Airdrie to Berwick, Edinburgh south to Carstairs and the Borders line
- 125mph high speed railway

1 – Career Overview

2019 – 2020

- **Track Maintenance Engineer (West Highlands)**
- Helensburgh to Oban, Fort William and Mallaig
- Tertiary route, primarily jointed track
- Included Off-Track responsibility for whole Glasgow Delivery Unit

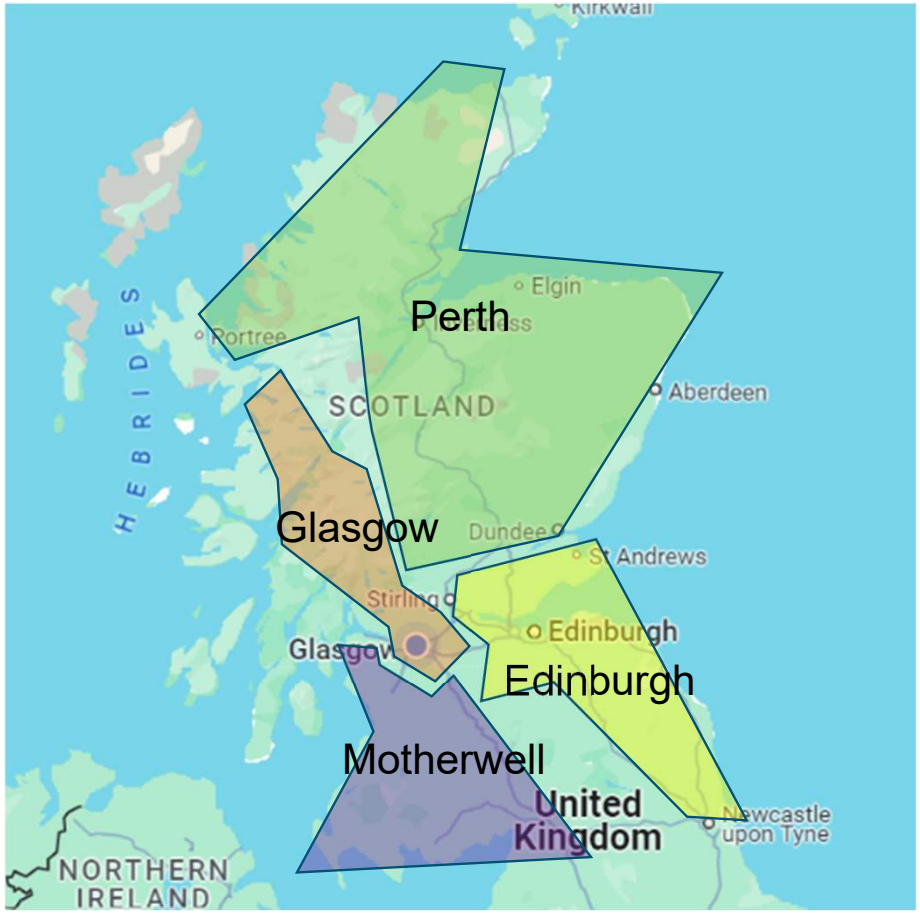
2020 - 2024

- **Track Maintenance Engineer (Glasgow East)**
- Suburban railway across north Glasgow, Queen Street Station and part of E&G mainline
- Mixed asset including 100mph track, 6 miles of slab track tunnel, high number of curves

2024 - present

- **Infrastructure Maintenance Engineer (Glasgow)**
- Glasgow and the West Highlands
- Multidisciplinary role – focal point for Track, Signalling and Telecoms Engineers

2. Network Rail Maintenance in Scotland – Geographical Structure



Four “Maintenance Delivery Units”, all with a unique set of assets and challenges

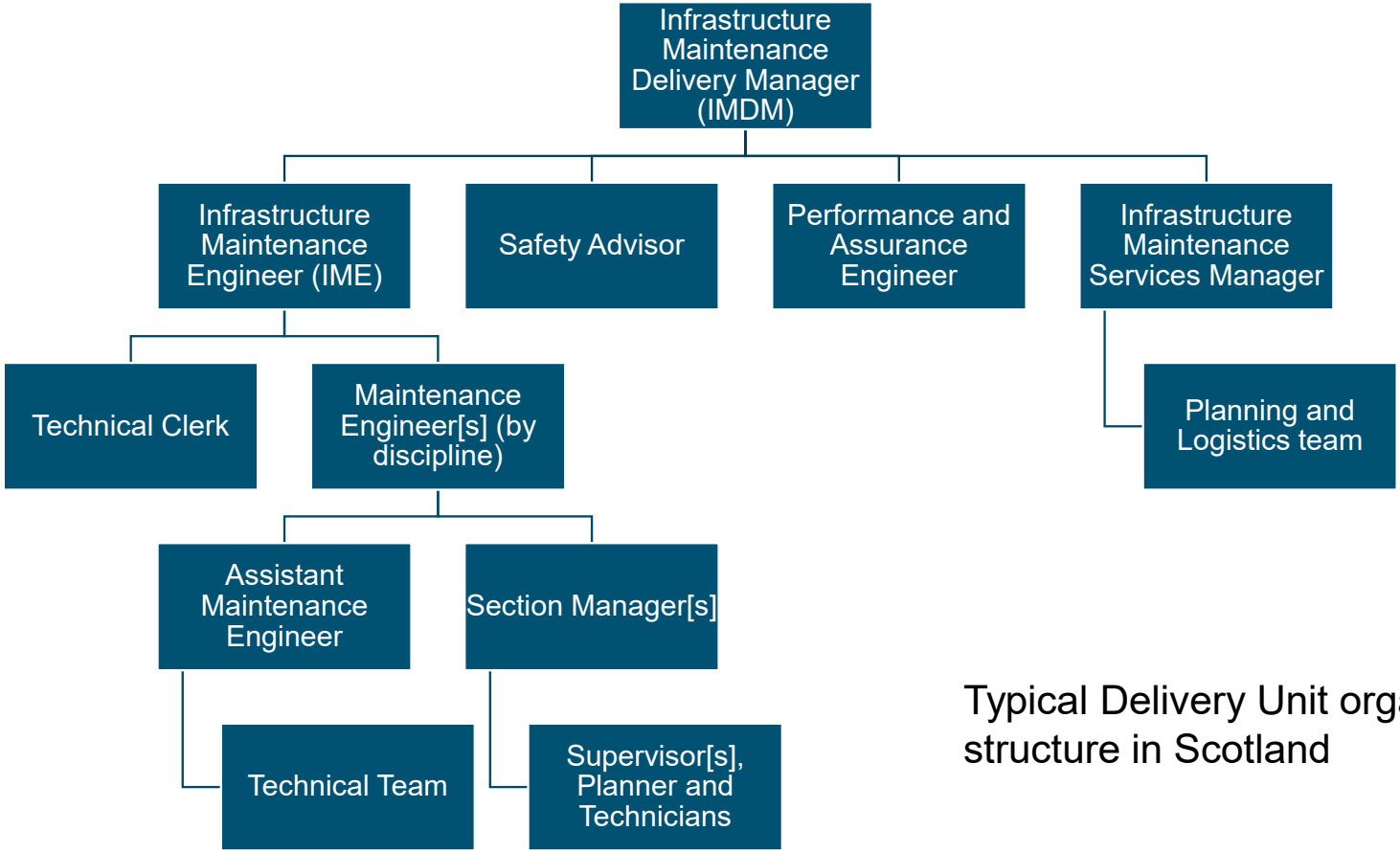
Delivery Unit	Track Miles
Edinburgh	679
Glasgow	533
Motherwell	797
Perth	819

Delivery Unit	Track Miles (Cat 1 and 2)
Edinburgh	265
Glasgow	66
Motherwell	285
Perth	75

Train Running Comparisons 23/24 Vs 24/25

	EDINBURGH	GLASGOW	MOTHERWELL	PERTH
2023/24	178,559	347,154	122,602	75,440
2024/25	174,471	334,854	121,242	66,408

2. Network Rail Maintenance in Scotland – Organisational Structure



Typical Delivery Unit organisation structure in Scotland

3. What Does "A Day in the Life" Entail?

Ensuring that trains run safely and on time…

- SAFETY: Compliance, inspections, plans, investigations, competency
- PERFORMANCE: Asset resilience, failure investigation, data, response, weather mitigation

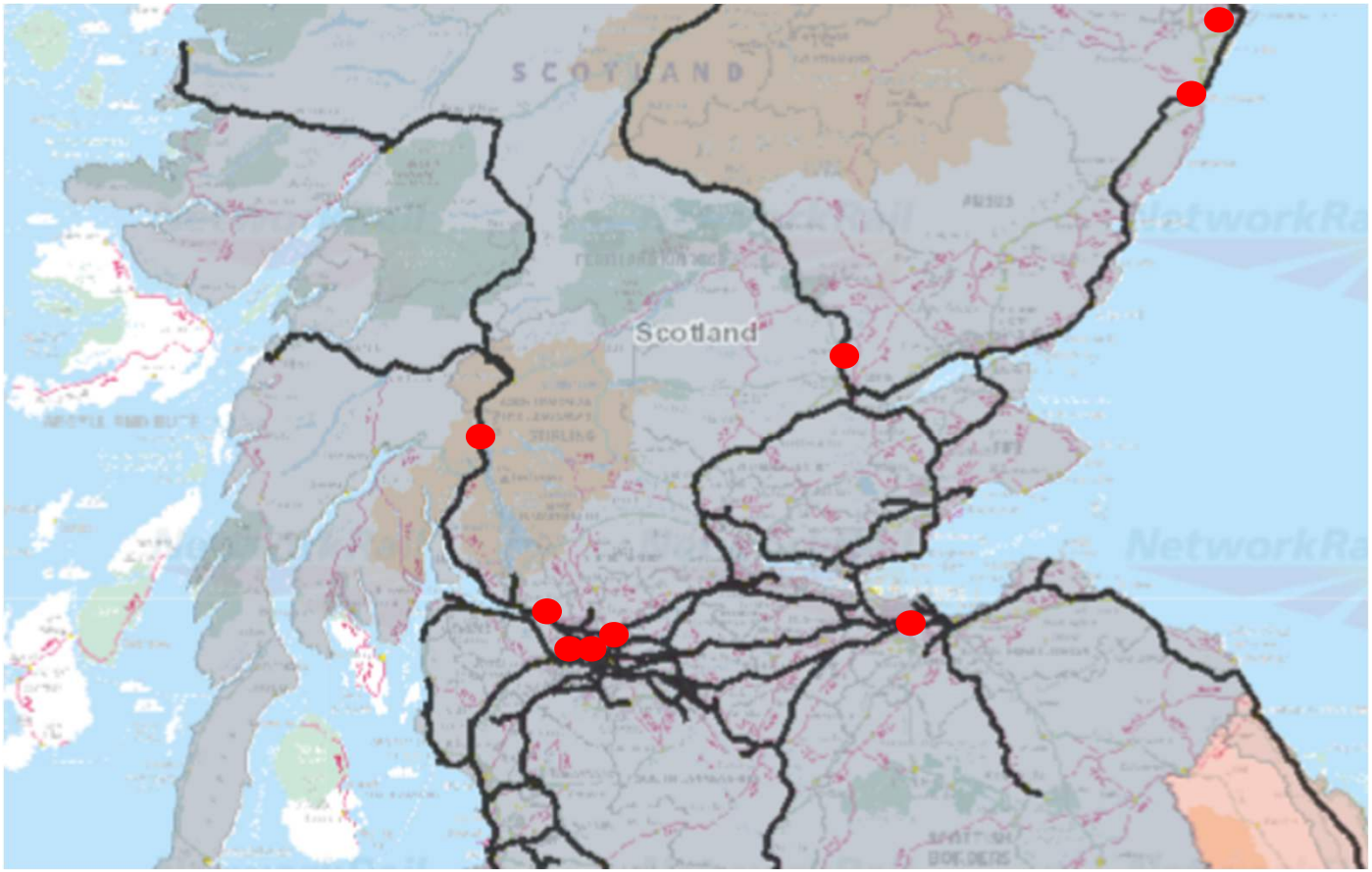
…..and a few more things besides, with a consistent helping of unpredictability!

3. What Does "A Day in the Life" Entail?

4 x 4 week defects removed, 1 x 26 week defect removed, 3 x 4 week defects prepped mitigated and replanned for wk 27, 1 x point end tamped

One week in the life of one Track Section Manager

4. Case Studies – Interesting Experiences



4. Case Studies – Interesting Experiences

Lesson 1: Always take lots of photographs!!

4. Case Study 1 – Glasgow Central S&C (“The Jungle”)

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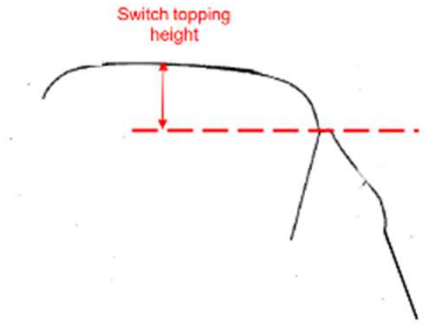


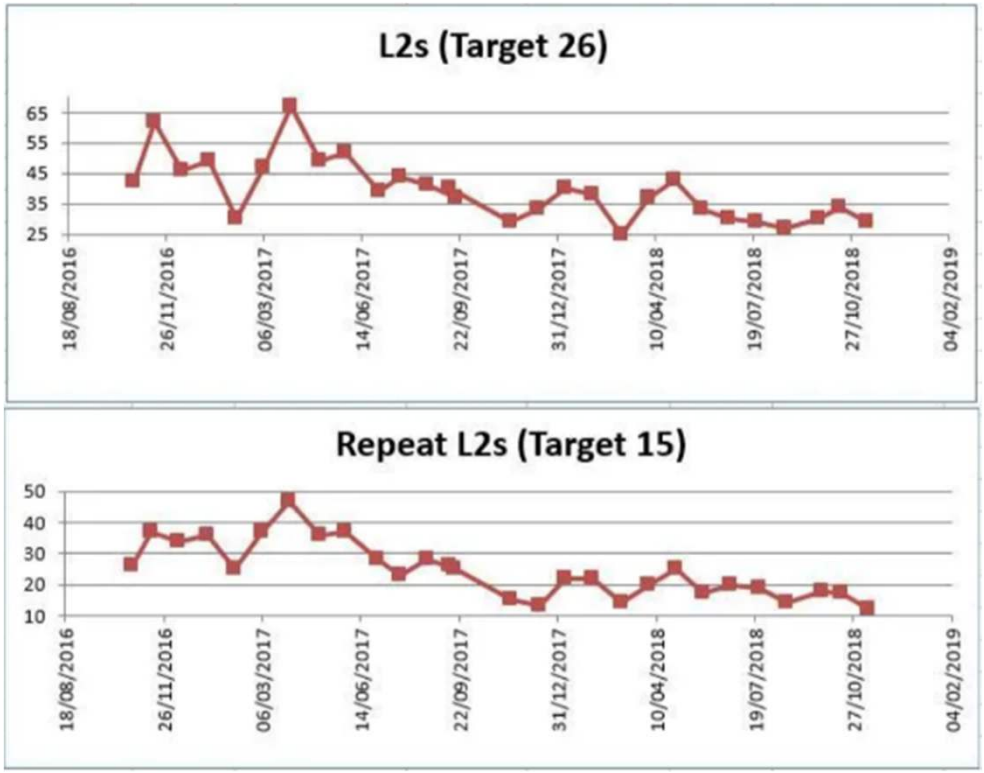
Diagram and photo demonstrating “Switch Topping Height” – taken from NR/BS/LI/284

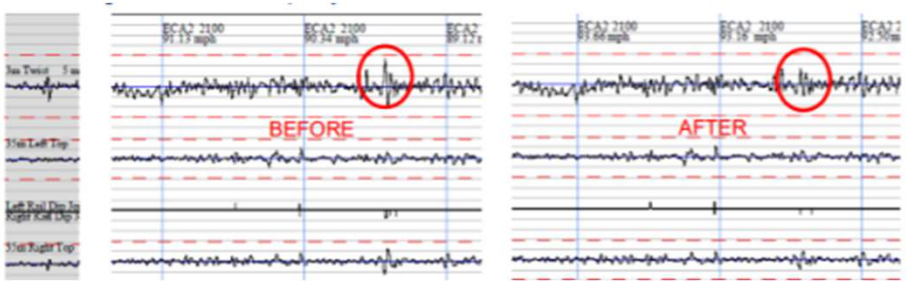
Switch	Half Set	Facing move affected	Location	Date of failure	Traffic details	Actions taken / dates	Current Status	Switch ordered	Switch Delivered	Switch Installed / Repaired
334	LH	Reverse	Central	31/03/2015	*plat 3-11 across to line 7 - check if used*	*Ban to facing moves 01/04/15* *Attempt temp weld repair 05/04/15* *Order switch highest priority* *Sidewear repair completed 12/04/15 and confirmed as permanent*	Repaired	01/04/2015	COMPLETION 14/04/15 DELIVERED 01/05/15	Sidewear repair 12/04/15
372	RH	Normal	Central	31/03/2015	*Up Ayr to line 8 - regularly used*	*Replace half set 02/04/15*	Installed	ON SITE	ON SITE	INSTALLED 02/04/15
376A	RH	Normal	Central	31/03/2015	*All incoming traffic on line 2 - heavily used*	*Plain line 03/04/15* *1 day dispensation required*	Installed	01/04/2015	PLAIN LINED 25/04/15	INSTALLED 22/11/15

4. Case Study 1 – Glasgow Central S&C (“The Jungle”)

There’s always a solution!

4. Case Study 2 – Track Geometry in Edinburgh Waverley Section





Reduction in faults during time as TME Edinburgh, including a focus on “L1s”

4. Case Study 2 – Track Geometry in Edinburgh Waverley Section

Marginal gains soon add up

4. Case Study 3 – Landslip near Ardlui

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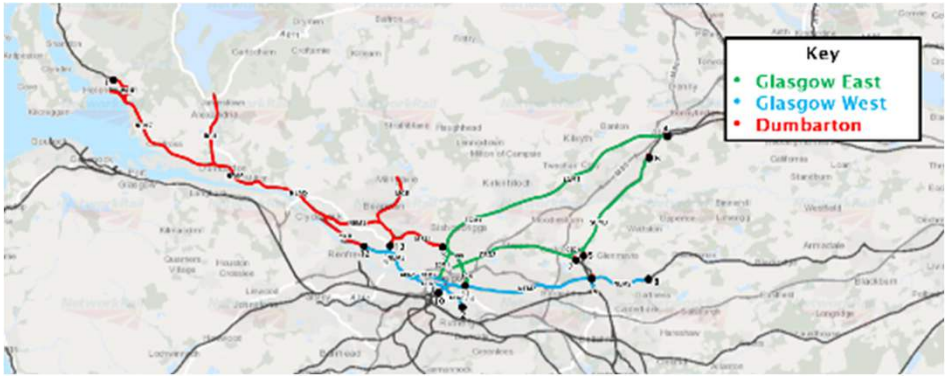
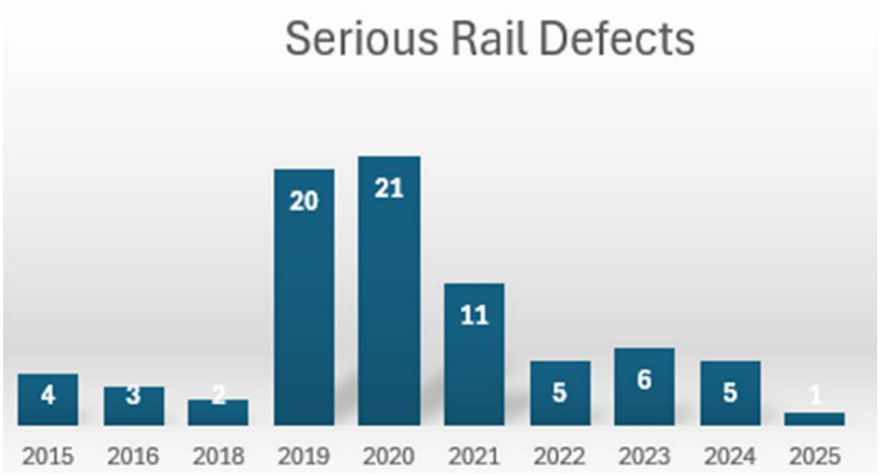
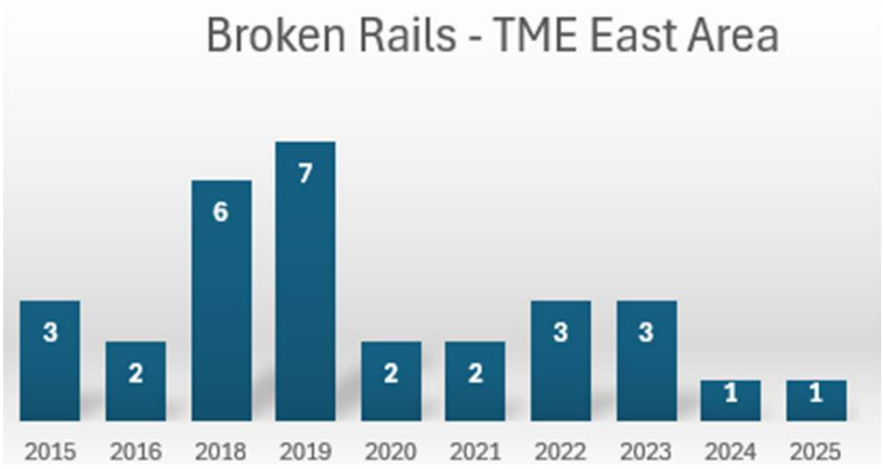
Never underestimate the value of experience

4. Case Study 4, 5 and 6 –TME Glasgow East Recovery



4. Case Study 4 –TME Glasgow East Recovery – Rail Defects





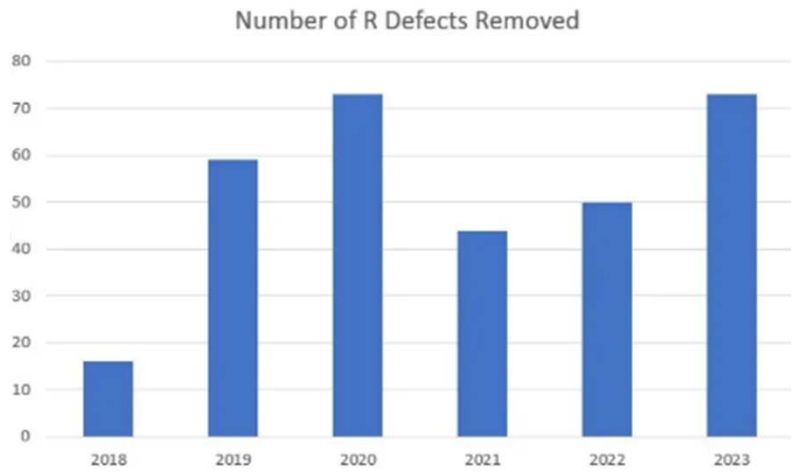
4. Case Study 4 –TME Glasgow East Recovery – Rail Defects

Three-phase approach to bringing rail defects under control:

2020 - Set up dedicated re-railing team using additional resource

2021 - Transitioned re-railing workload onto maintenance sections as we regained control

2022 - Moving into a more proactive footing – focus on more minor "Retest" defects

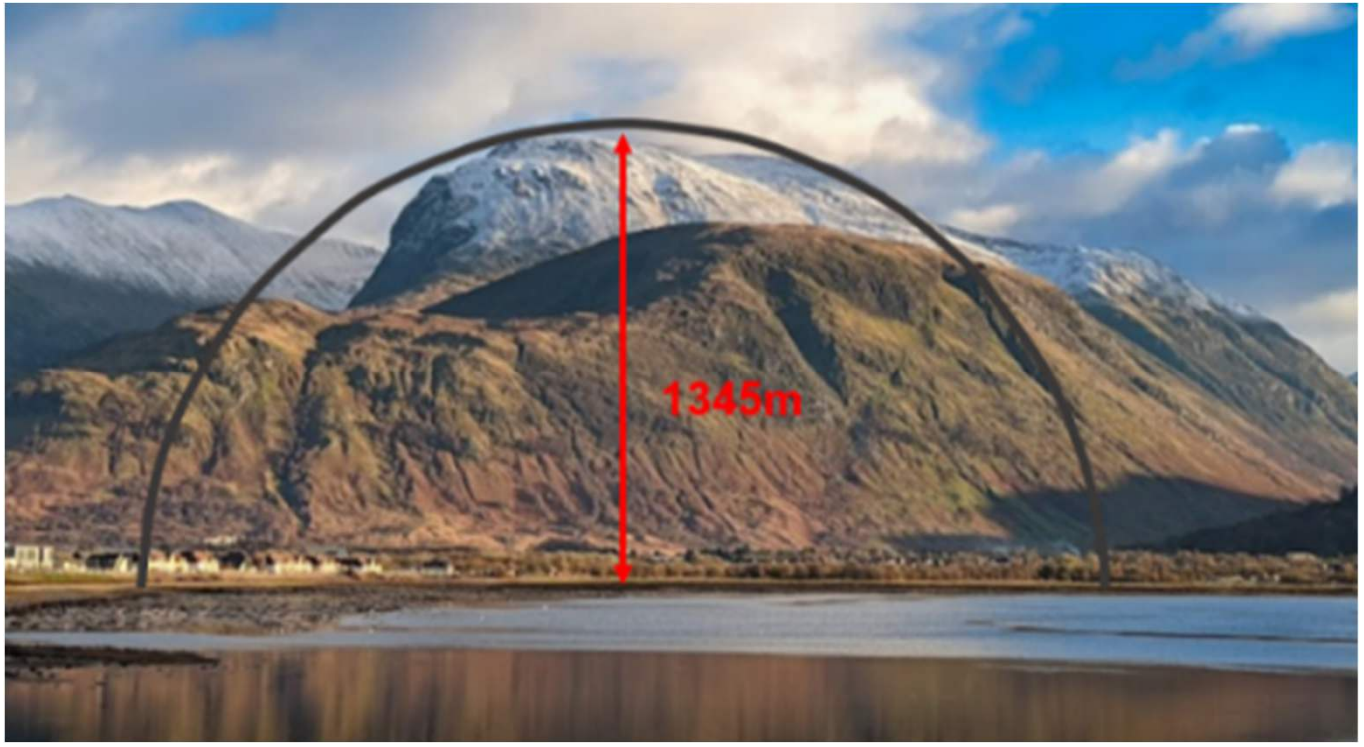


Key Results – 2020 to 2024

> Reduced rail defects from 483 to 339

> Reduced RCF in "Very Severe", "Severe" and "Heavy" categories from 3568 to 1473 yds

4. Case Study 4 –TME Glasgow East Recovery – Rail Defects



In 2023/24 one TME area installed enough rail to build an arch over Ben Nevis!

4. Case Study 4 –TME Glasgow East Recovery – Rail Defects

Trust in your strategy – give it time to work

4. Case Study 5 –TME Glasgow East Recovery – Track Access

Until 2021/22 the Rail Head Treatment train ran for 12 weeks in a way that severely disrupted maintenance access:

4. Case Study 5 –TME Glasgow East Recovery – Track Access

From 2022/23 we agreed an alternative pattern with a 3-hour layover at Milngavie. This created approximately 60 viable maintenance shifts per year!

TOTAL TIMEBOUND RAIL DEFECTS						Commentary
PERIOD	6	7	8	9	AVERAGE	
2021/22	163	188	191	181	180.8	*In 2022 we were able to reduce timebound rail defects from 150 to 106 during RHTT running period. In 2021 they increased from 163 to 181.*
2022/23	150	131	140	106	131.8	
Improvement	8%	30%	27%	41%	27%	

VOLUME OF RAIL CHANGED (YDS)						Commentary
PERIOD	6	7	8	9	AVERAGE	
2021/22	81	98	20	57	64.0	*The volume of rail changed was increased by 300% as the new approach made it feasible to change rails midweek*
2022/23	309	175	154	385	255.8	
Improvement	281%	79%	670%	575%	300%	

TOP21 BACKLOG						Commentary
PERIOD	6	7	8	9	AVERAGE	
2021/22	20	16.75	9.25	6.75	13.2	*Average Top 21 (key compliance) backlog 59% lower year on year*
2022/23	4.25	4.75	6	6.75	5.4	
Improvement	79%	72%	35%	0%	59%	

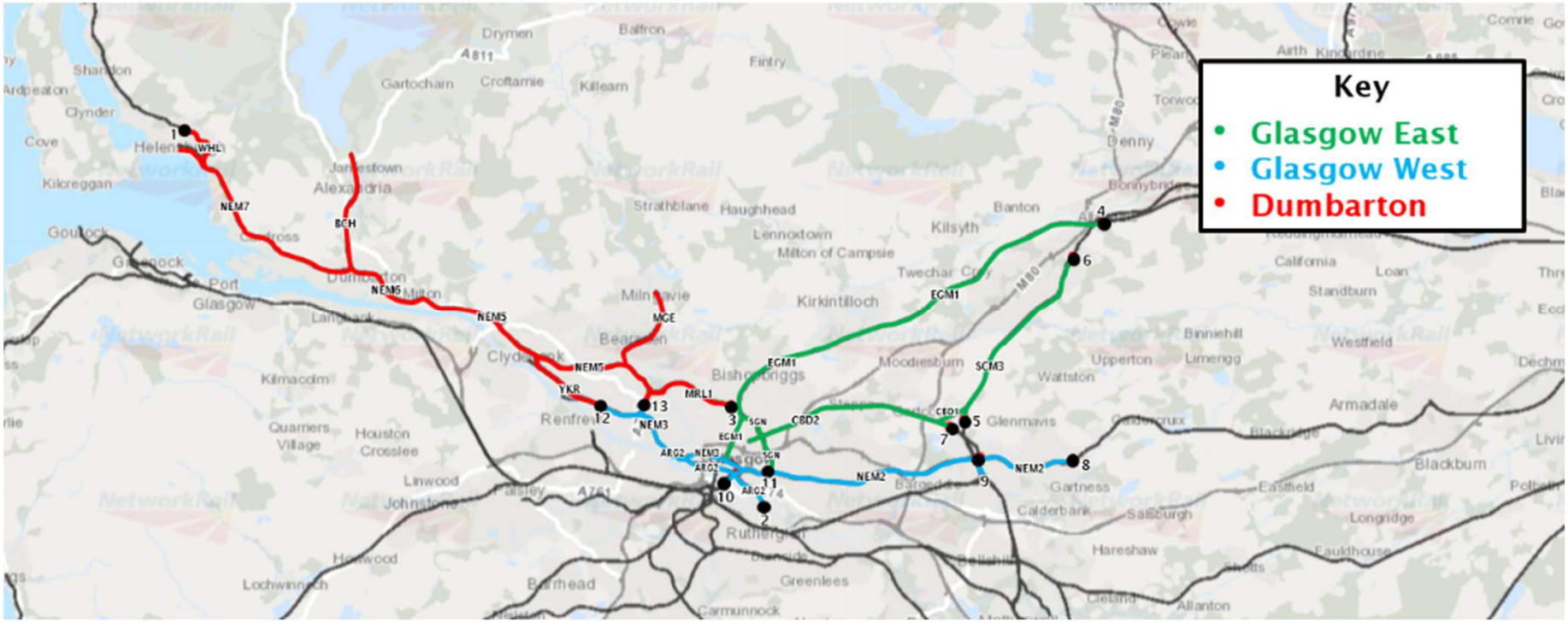
4. Case Study 5 –TME Glasgow East Recovery – Track Access

Sand-rover use on the Balloch Branch – Delivered by Maintenance to protect against a potential 65% reduction in track access time

4. Case Study 5 –TME Glasgow East Recovery – Track Access

Have your problems well-articulated, ready for your big moment!

4. Case Study 6 –TME Glasgow East Recovery – Organisational Change



In 2021 we split the old TSM Glasgow North section into two – “Dumbarton” and “Glasgow West”, recognising that the challenges had become too great for one Section Manager

4. Case Study 6 –TME Glasgow East Recovery – Organisational Change

Small, high-quality teams >> Large, low-quality teams

4. Case Study 7 – Track Defects at Cowlairs West Junction

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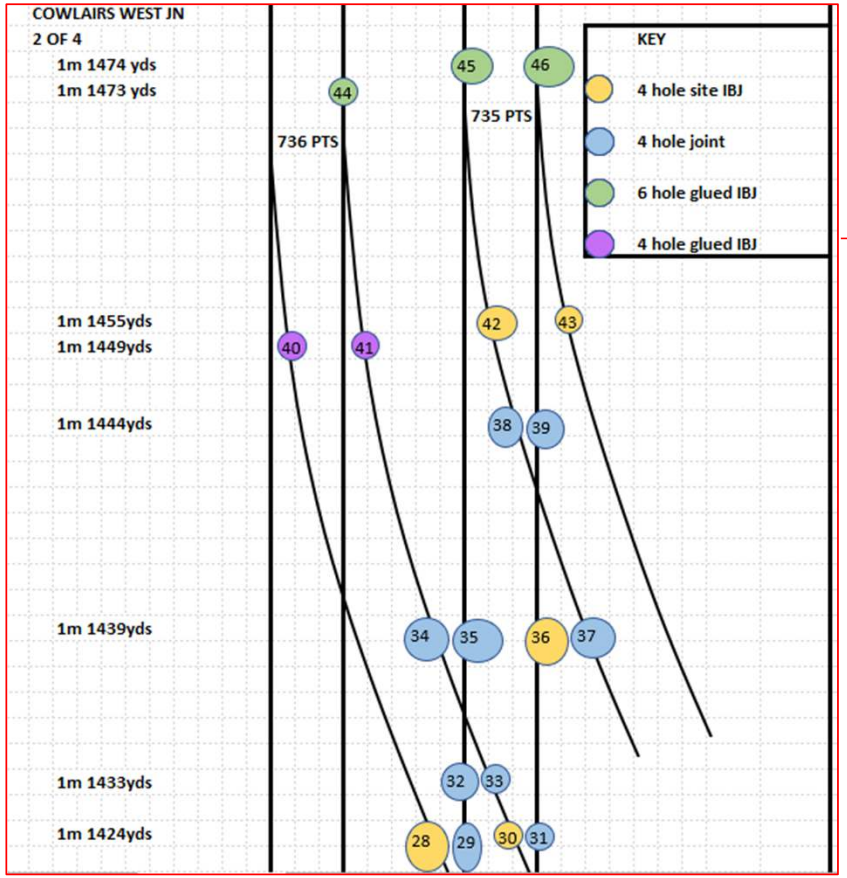
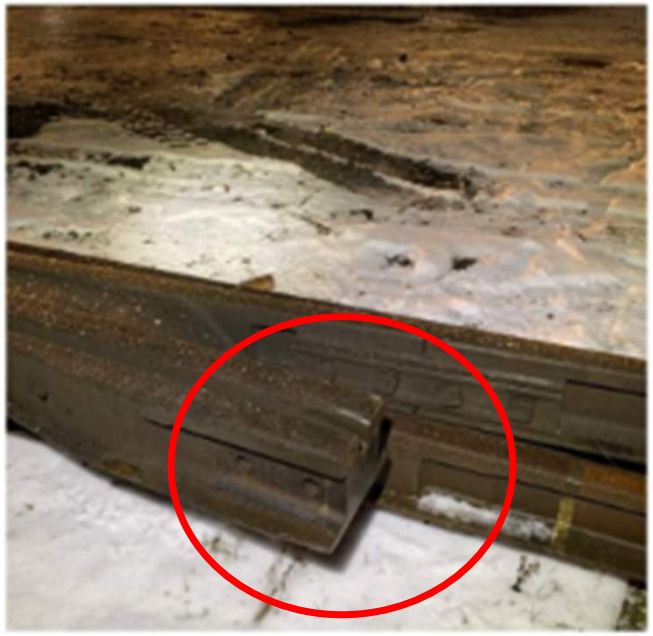


SITE DETAILS												
Joint Number	ELR	ID	Rail L/R	Mileage	Date of Survey	Approx Air Temp deg C	Joint Type Tight / Standard / Factory IBJ / Site IBJ	Voiding? None / Slight / Severe	Fastenings G/S/P	Pads G/S/P	Rail End Battered? Y/N	
											L	H
3	EGM1	1100	R	1.1591	03/03/2022	7	SITE IBJ	NONE	G	G	N	N
JOINT 3 RISK SCORE	EGM1	1100	R	1.1591	03/03/2022	7	4	0	0	0	0	0

S&C STRATEGY

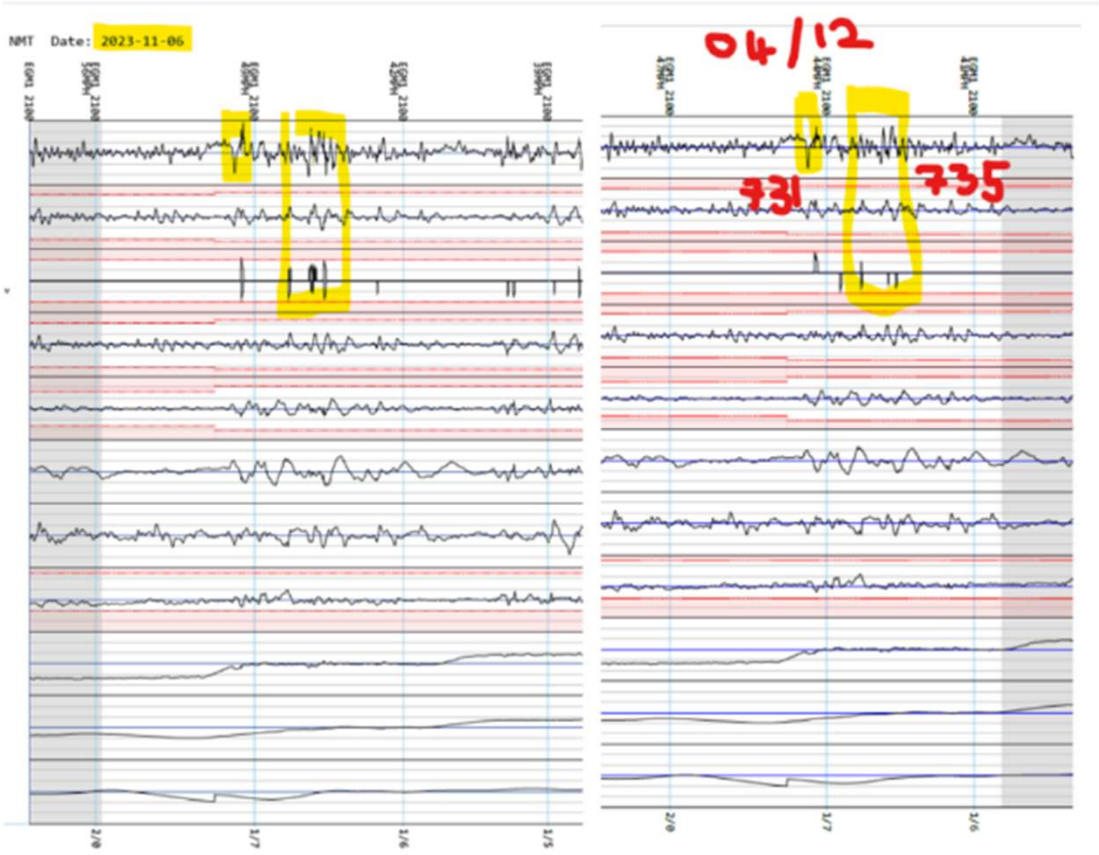
COWLAIRS WEST JUNCTION

4. Case Study 7 – Track Defects at Cowlairs West Junction



735 Crossing – bespoke crossing ordered to move very high-risk, inherently weak joint

4. Case Study 7 – Track Defects at Cowlairs West Junction



735 Crossing – before and after track geometry traces showing the benefit of moving the joint

4. Case Study 7 – Track Defects at Cowlairs West Junction

2014

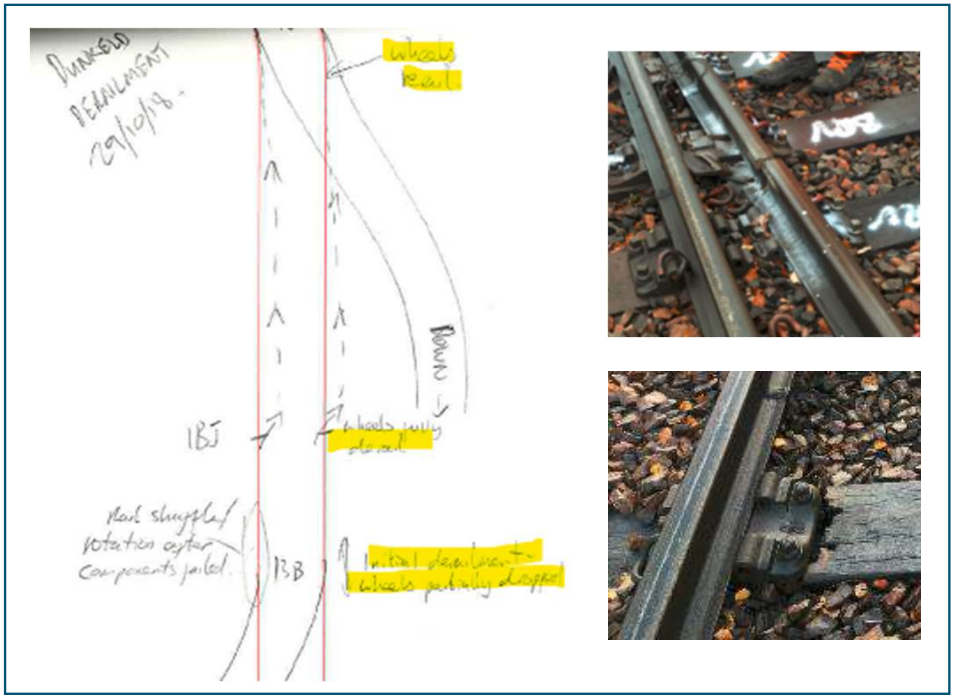
2025

4. Case Study 7 – Track Defects at Cowlairs West Junction

Risk assess and prioritise

4. Case Study 8 – Derailments

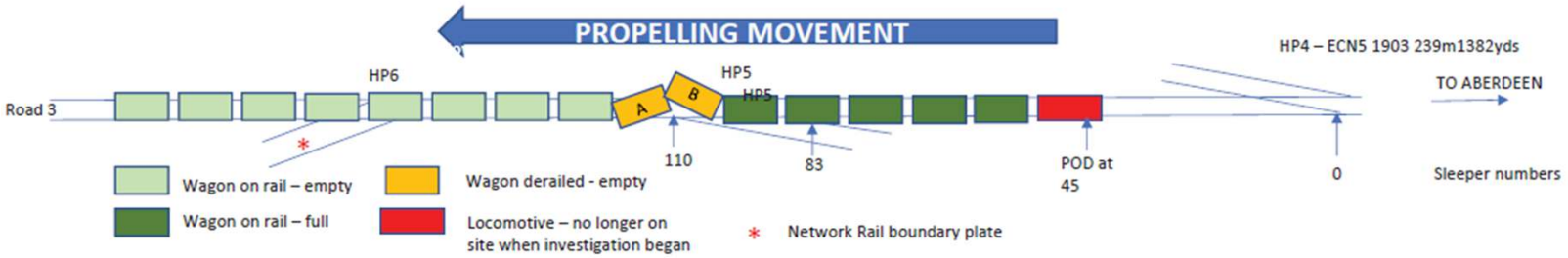
Stonehaven

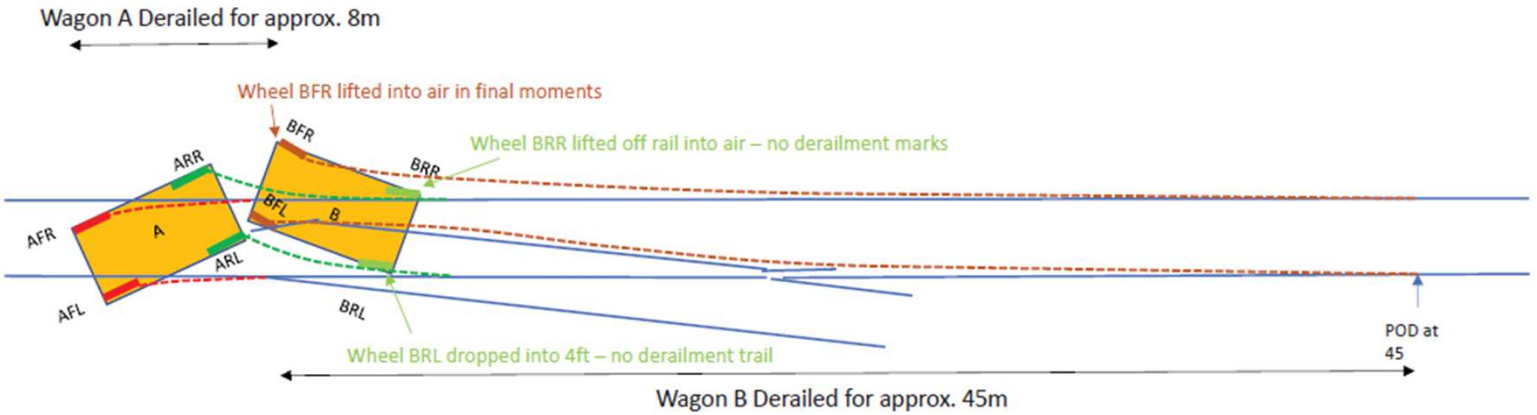


Dunkeld

Coatbridge
Sunnyside

4. Case Study 8 – Derailments





Craiginches Yard, Aberdeen

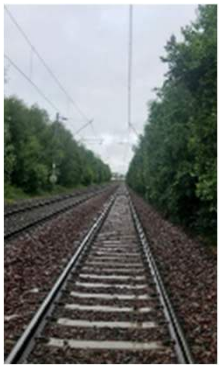
4. Case Study 8 – Derailments

The point of derailment isn't always obvious

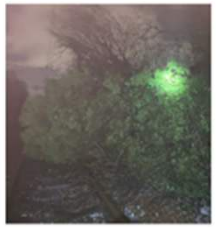
And….it takes a long time to rerail a train!

4. Case Study 9 – The Vegetation Challenge



Competing demands:
Obstruction, Signal Sighting, Overhead Line Trips and/or damage, adhesion, track circuit WSF, dead and dangerous trees, public service requests










Storm impact - Eowyn (154 trees down) and Floris (84 trees)

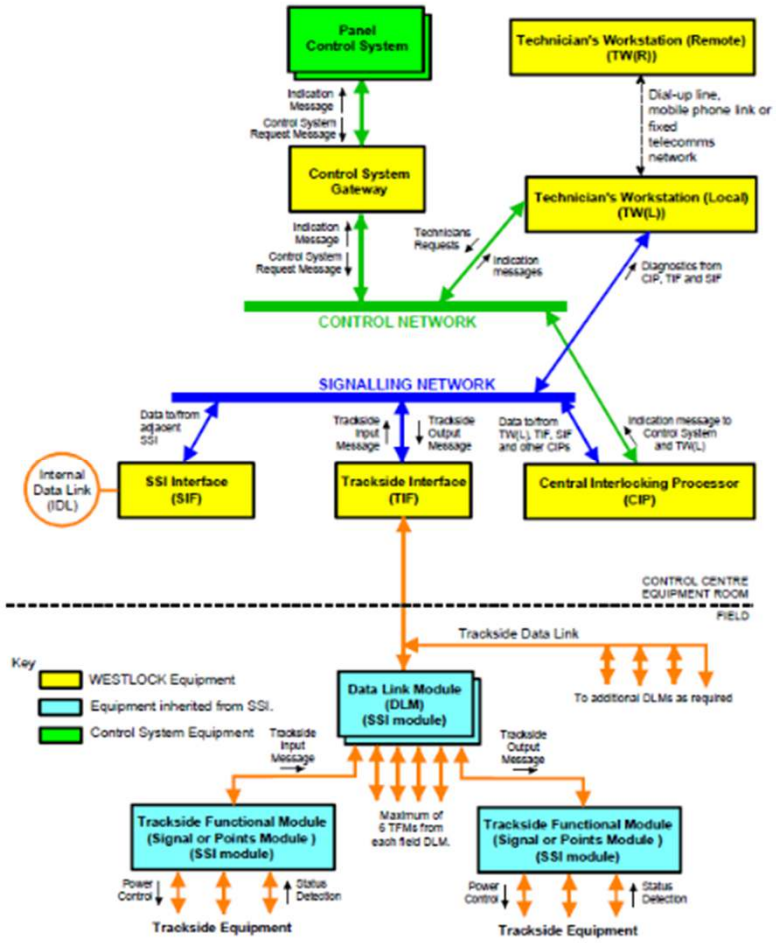
4. Case Study 9 – The Vegetation Challenge

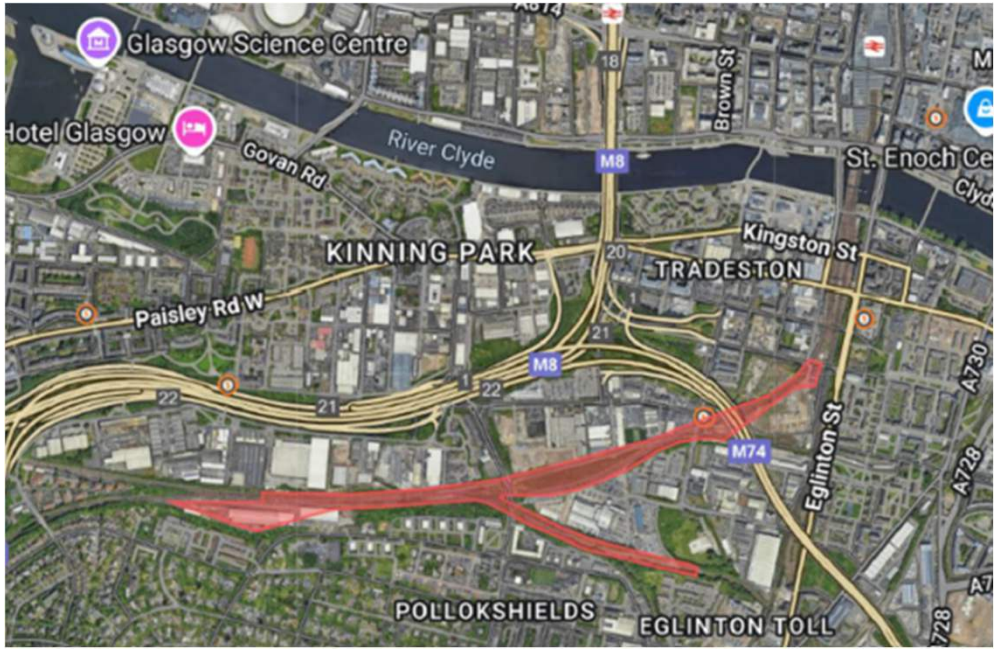
(Tentative!)

In dealing with big problems, be careful not to let small ones take over

4. Case Study 10 – Multiple Track Circuit Failures at Shields

A typical WESTLOCK Interlocking is shown in Figure 2.1.





Intermittent failures of multiple track circuits across the area shaded, persisting over 7 days

4. Case Study 10 – Multiple Track Circuit Failures at Shields

Bring the right people together to solve the problem and be systematic

5. Key Medium to Long-Term Challenges in Railway Maintenance

- The financial climate
- Maintaining an aging asset: being proactive and efficient with our resource
- Improving our approach to “the railway as a system”
- Climate change: ensuring assets can cope
- Track access balance: working with operators to meet maintenance **and** operational need
- What structural changes will we see in the rail industry?

6. Advice for a Maintenance Engineer

- Have a routine and protect it
- Be persistent
- Be ready to spend money effectively
- Monitor data over the long term


Thankyou – Questions?
Photo Credit: Stuart Russell, PTO Glasgow Central