High Output Track Renewals
A Lean Yellow Railway Journey

Ben Brooks, Project Director

October 2015

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The UK rail industry

1.3billion journeys

225m

More passenger journeys will be delivered each year on the country's rail network by 2019

170,000

More seats for commuters by 2019

Freight demand growth

Over the next decade we expect freight demand to grow by at least 30% and as much as 140% over the next 30 years

Cost of running the railway

6.5m

Trains run on time every year

100 million tonnes of freight

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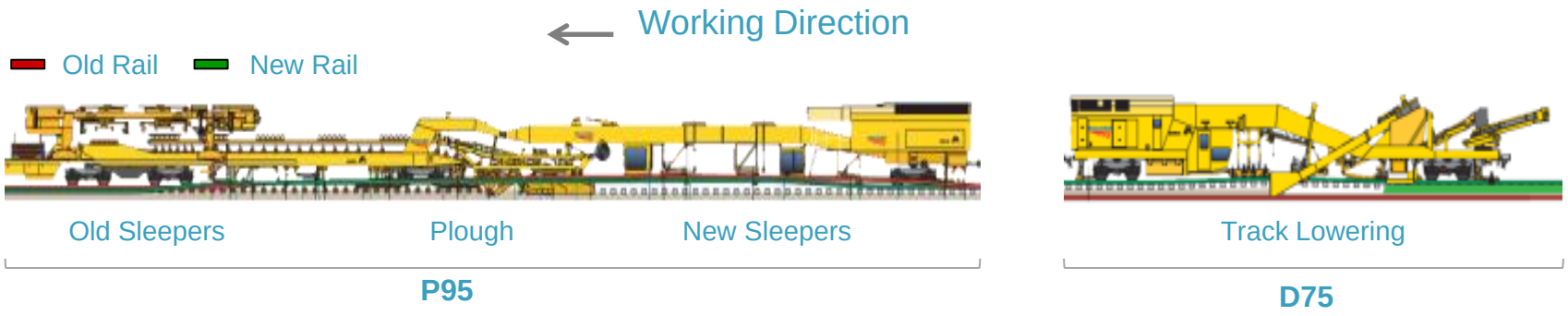
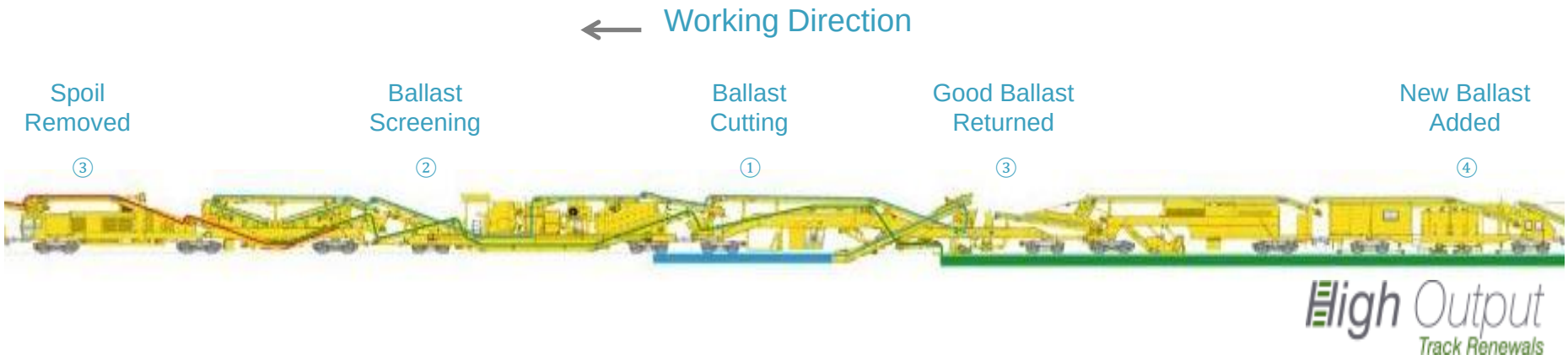
Track Relaying System (TRS)



Ballast Cleaning System (BCS)



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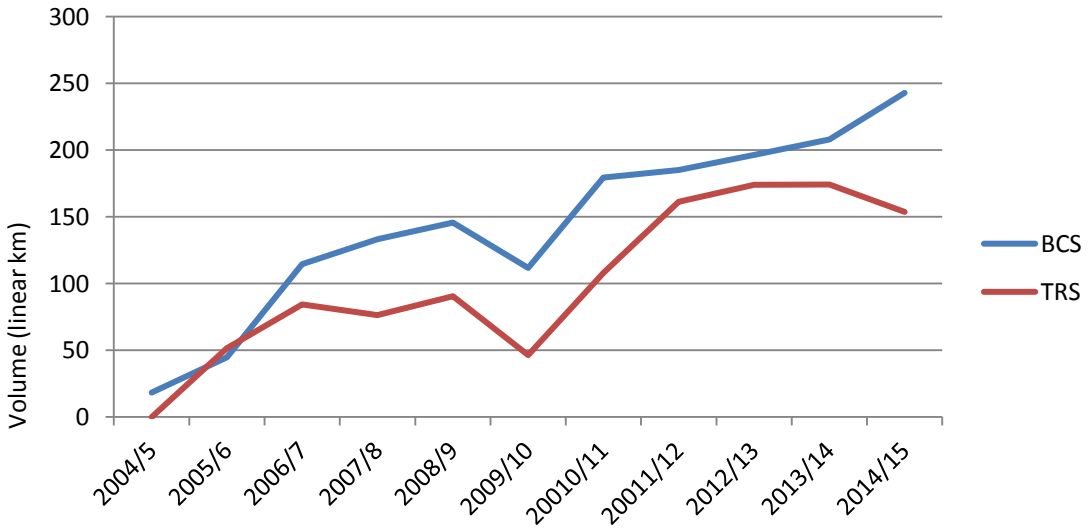
Timeline

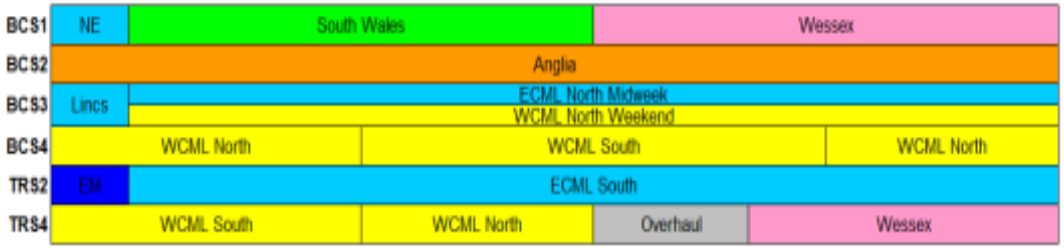
Why High Output?

- Minimal planned passenger impact
- A safer working environment
- Minimal risk of overrun



What makes us unique?

- 3rd biggest High Output fleet in the world
- Working 12 months a year
- In short duration access
- Handing back at up to 100 mph



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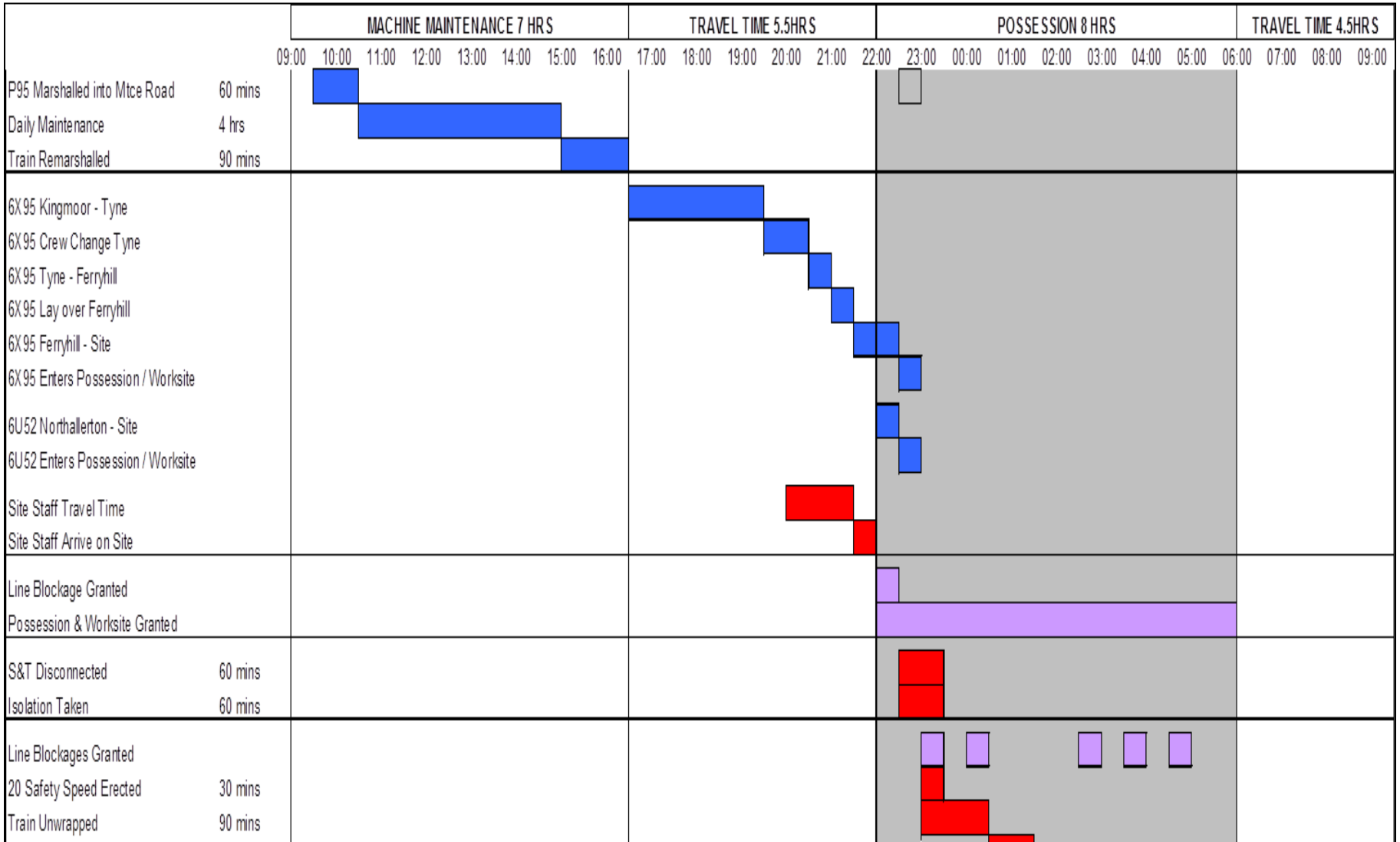
A day in the life



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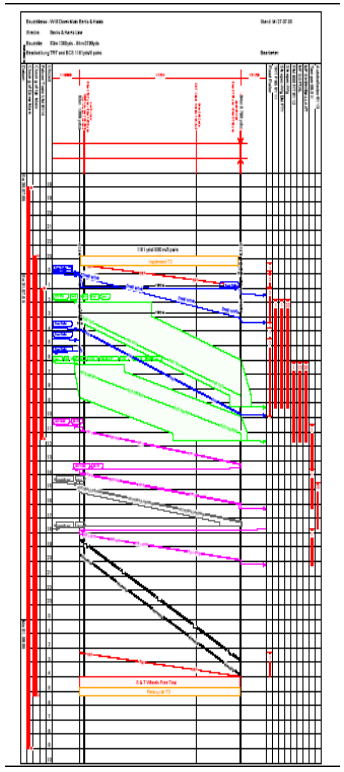
A different mind set?

Planning applying time - distance methods



Engineering Innovation

Logistics dedicated operating bases

Taunton Fairwater Yard
Western HOOB

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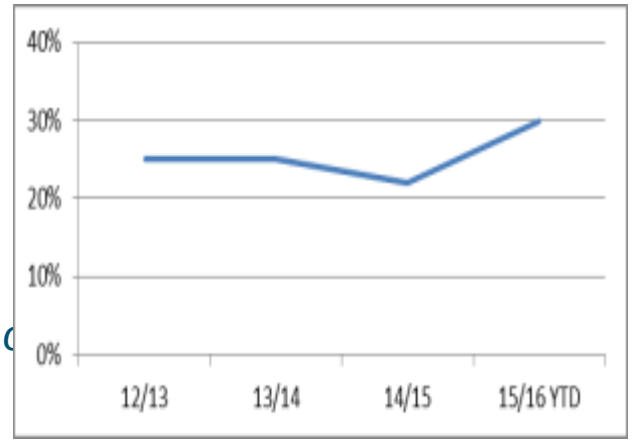
W*here on the journey?*

Key measures

- Safety
- Cost
- Volume
- Impact

Volume loss is major area c

Volume loss v 100% plan



Key areas of focus

- Access & utilisation
- Process efficiency
- Reliability

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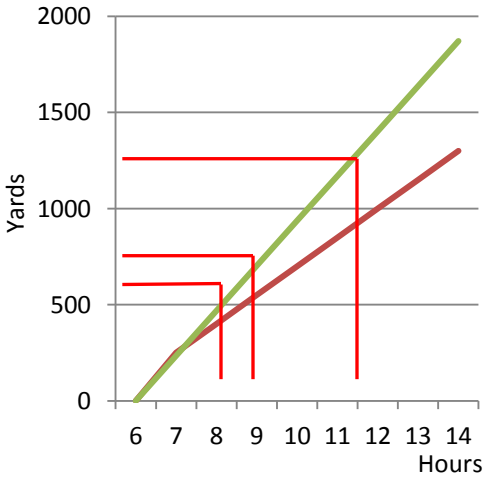
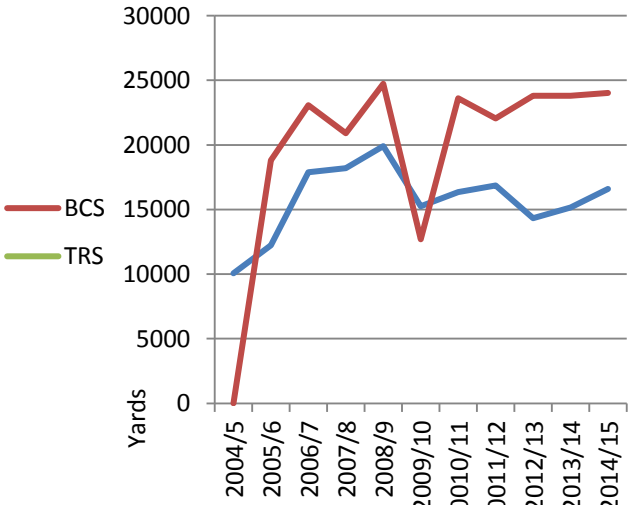
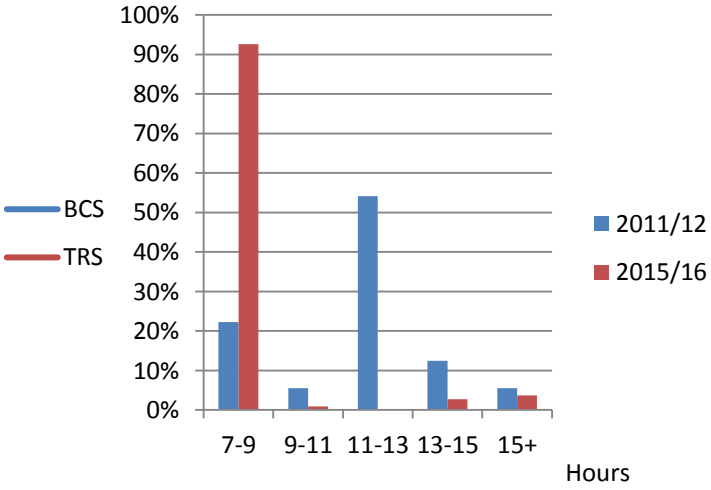
Access duration



Volume delivery v's possession time



Volume output per system per quarter



Saturday night average access durations

"The very best of railway engineering in practice, although quite possibly the least efficient production line I've ever seen." *Richard Parry Jones, former Chairman*

Root cause analysis has led us to be more data driven in access negotiation - dedicated team to look at engineering work impact vs. TOC/FOC costs to enable balanced industry decisions.

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Process efficiency
via time saving initiatives

Visual management principles

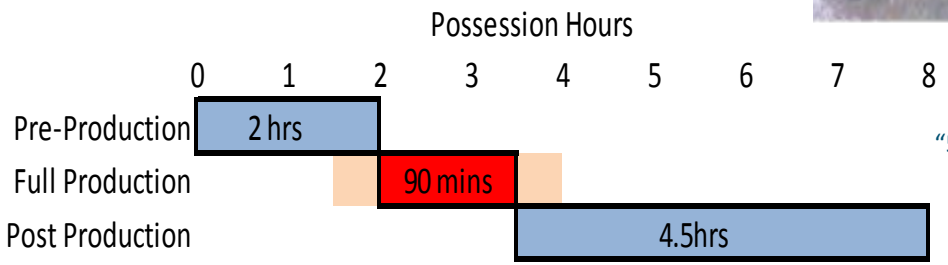
Process mapping redesign

A robust, data-driven process involving workshops, briefings and training events for supervisors, trackmen and operators

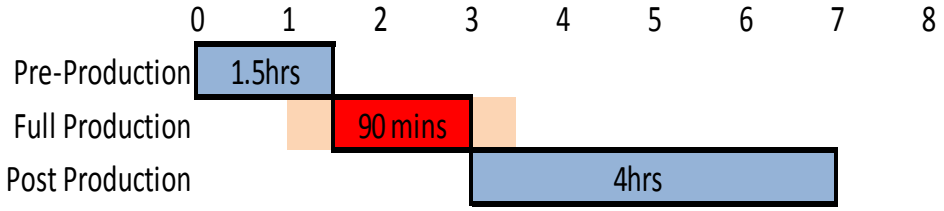
Equipment improvements to remove waste

"5S" Cutter Bar Tool Storage

Cutter Bar Hole Gauge



Typical Midweek Possession 2011/12



Typical Midweek Possession 2015/16

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Case study

Safe & efficient access

Project remit

1. To effect a step change improvement in safety when securing access for engineering work

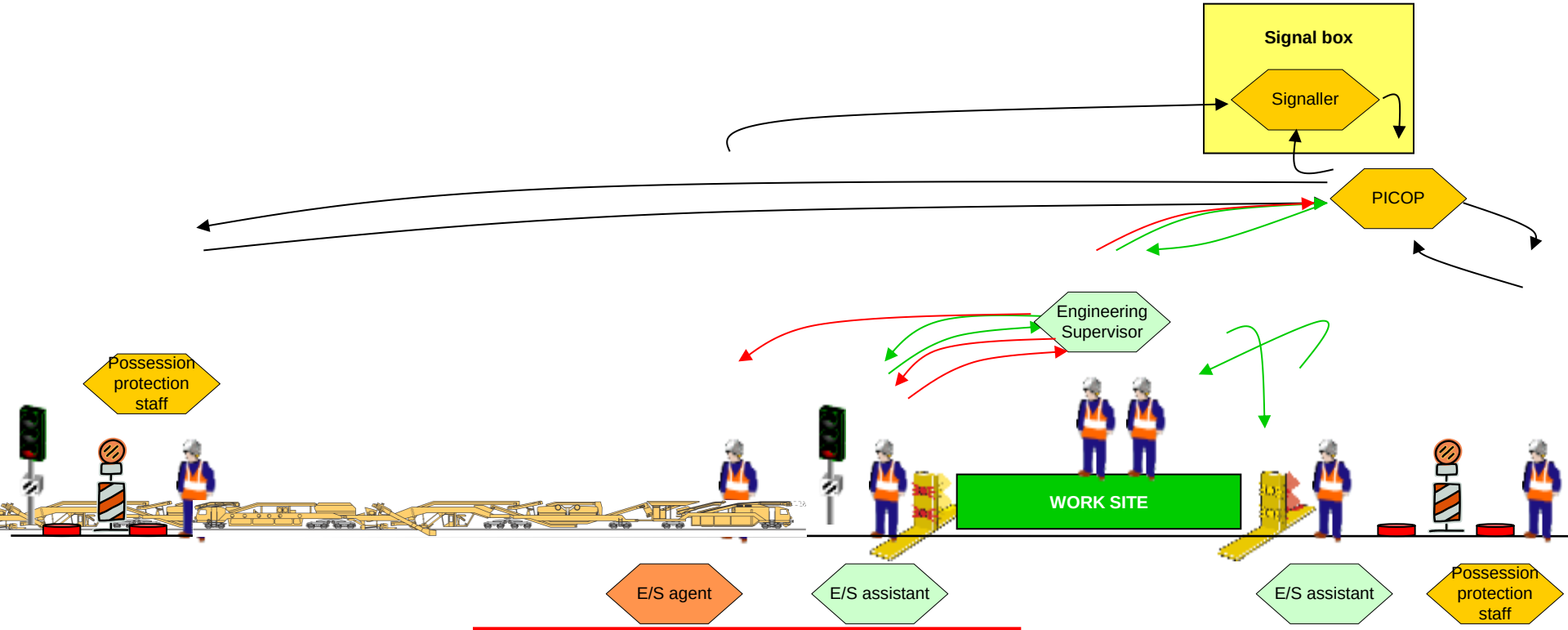
2. To move from an operational railway to a worksite in under 2 minutes.

Industry norm

Explosives and flags still used to protect workforce, despite significant improvements in signalling technology - workforce put at risk in placing this protection.

Case study

Historic approach for protecting worksites



17 separate phone calls – just for the ballast cleaner

Case study

Issues with historic approach

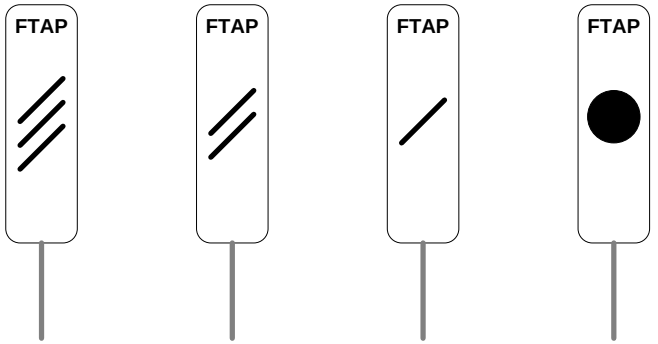
- The process is long winded, complicated, involves many parties, relies on multiple 1:1 verbal communications. This creates opportunity for error
- Placing detonators / possession markers is a hazardous job. It is a major cause of possession irregularity and requires staff to enter the railway whilst trains are running
- The process is slow, eating into valuable time which could be used to improve the underlying asset condition (current planned time = 20mins)
- It is acceptable to rely on signalling to keep trains apart. But the same reliable system is not used to keep engineering trains apart. Detonators are explosives – but won't stop a train (TPWS activated by a signal at danger would).

Case study

Technology and innovation solutions

FTAP

- Flexible train arrival point

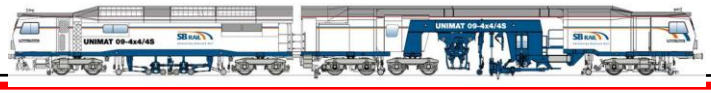


ZKL(RC)

- A remotely activated track circuit operating device (TCOD)

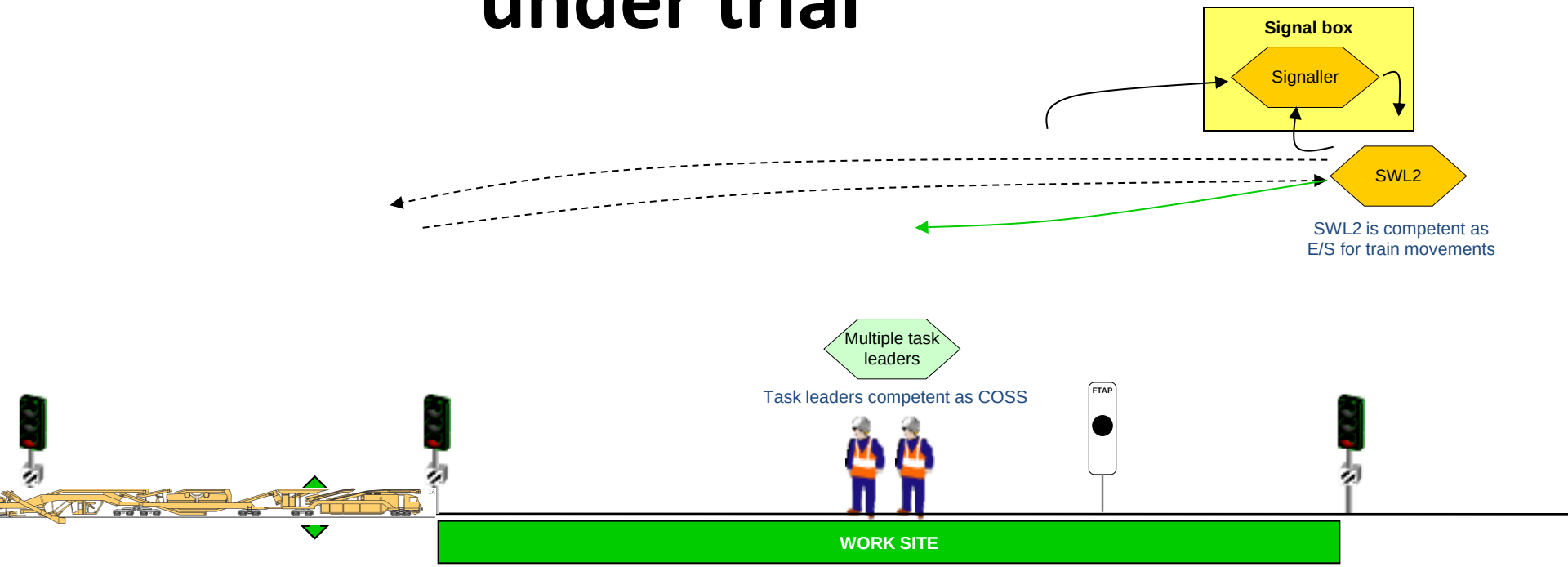
Protection Zone

- Tampers using the signalling system as protection



Case study

Worksite arrangements now under trial



4 separate phone calls – for the ballast cleaner

Case study

Safe & Efficient Access

Safer

- *Eliminated the risk* of exposing staff to moving trains when placing / removing protection on the night

Quicker

- *40 minutes more production* - 16 minutes at the start can be reduced to just 2 minutes to start work after train arrival - a further 24 minutes saved at handback

Fewer train delays

- More responsive to exiting trains / machines at end of possession, preventing overruns

I can't believe how quick and easy that was.

Is that it? It's so simple!

Definitely the future…

Process efficiency

via structured continuous improvement

IP Track Continuous Improvement **toolbox**

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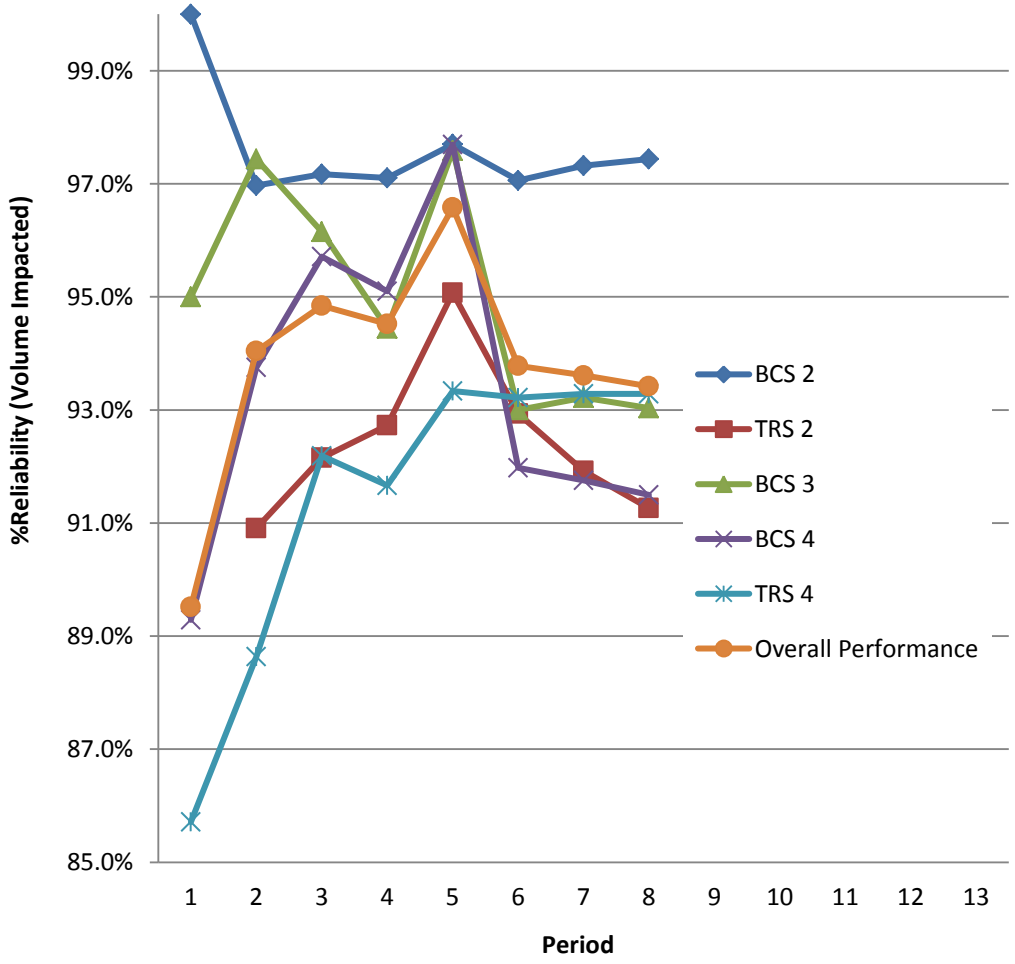
Reliability
Plant



Develop capability
- Plant reliability team and cross industry consultancy support.

Data capture & analysis
- Control charts / trend analysis

Actions
- Revised maintenance plans with greater focus on problem areas and more available shifts.

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Reliability
Stable plan

Stage gate focus

- Visual management used to monitor stagegate progress.
- Escalation processes followed to bring issues to resolution or find alternatives.

Weekly depot planning meetings

- Plan-do-check-review cycles in place within depots
- Collaborative planning meetings
- Simple visual controls

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Reliability
Route customer

Engineering Train Performance Measure (ETPM)

Summary - Track Delivery High Output - 2015-16 Week 29

Weekly Summary					
National	YO	PAP	PDP	YI	No. Trains
National	93%	93%	87%	93%	30

YTD Summary				
YO	PAP	PDP	YI	No. Trains
90%	65%	88%	87%	781

Route	YO	PAP	PDP	YI	No. Trains	YO	PAP	PDP	YI	No. Trains
Anglia	80%	100%	100%	80%	5	86%	68%	80%	80%	132
LNE & EM	100%	90%	80%	90%	10	95%	73%	88%	91%	232
LNW	100%	89%	78%	100%	9	89%	61%	89%	86%	256
Scotland	0%	0%	0%	0%	0	0%	0%	0%	0%	0
South East	0%	0%	0%	0%	0	0%	0%	0%	0%	0
Wales	0%	0%	0%	0%	0	93%	45%	93%	87%	115
Wessex	83%	100%	100%	100%	6	76%	79%	93%	93%	29
Western	0%	0%	0%	0%	0	59%	82%	94%	76%	17

What is ETPM?

The ETPM has been introduced to measure the punctuality of engineering trains* arriving at their possession arrival point in the last complete week within 0 – 9.59 minutes of their timed arrival**

*engineering trains currently refer to those supporting Track Renewals

**destination is the last timing location point scheduled and recorded in TRUST

<65% | 65-80% | >80%

Visual Management

Weekly “control room” meetings designed to highlight both High Output and Route team performance.

Reasons for volume loss (weekly and trends) reviewed in detail and actions monitored to conclusion. Focus on demonstrating benefits.

Key Performance Indicators

- Engineering Train Timing - *Engineering Train Timings received at T-5*
- High Output System Timing - *HO trains at PAP within 10 minutes of requested time*
- Line Blockage Timing - *Blockages granted within 5 minutes of planned time (line blockage remaining same duration)*
- T3 Possession Timing - *T3 possessions granted within 15 minutes of planned start time*
- Isolation Timing – *Isolation Form B provided within 15 minutes of planned time*

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Summary

High Output Track Renewals

- Renewing the nations railway unseen
- Safely, efficiently and in reducing access windows as we run more trains than ever
- World leading – short duration access and high handback speeds, all year around

Lean tools

- Applied to improve access, process efficiency ar

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Summary

It’s a long lean yellow journey…

- Feed the teams desire to improve
- Encourage the culture you’d like to see
- Provide the right tools / techniques
- Empower the team to change things for the better

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Any questions?

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