

Optimising the Legacy System- The challenge of fleet maintenance





Iarnród Éireann

IMechE 14th-15th October 2015



Session focus:

From a rolling stock perspective:

- “ Understand the legacy system, constraints and challenges
- “ How Irish Rail deal with these issues
- “ Fleet maintenance – what to do in house / outsourcing
- “ Improve fleet & depot safety and performance with major resource constraints

Iarnród Éireann Our Network, Our Services



Each week:

4,300 train services run

638 carriages in our fleet

2,200 kilometres in our network

726,000 passengers carried


144 stations served countrywide

325,000 kilometres travelled

Operating safe, customer-focused, sustainable services across Intercity, DART and Commuter which benefit our economy, communities and our customers



Iarnród Éireann Our Network, Our Services

- “ State owned national Railway Operator of Ireland
- “ Part of CIE Transport Group 
- “ Operating since 1834 – worlds first commuter Railway
- “ Invested more than €2.5bn since 2000
- “ Fleets from Japan, South Korea, Spain, USA, France, Germany
- “ 1st European country to buy trains from Asia

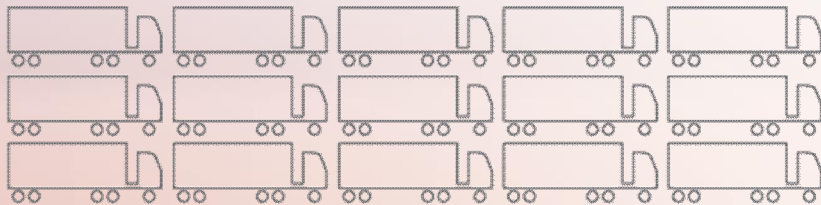


Iarnród Éireann Our Network, Our Services

99.8m tonne kilometres

of containers, mineral ore and timber are transported annually by **rail freight**

Over 26,000 truck movements removed from roads annually





The Legacy System!!






Iarnród Éireann

Legacy system – What is it?

....From a Fleet operations and maintenance perspective



Legacy system = Constraints

People

Fleet

Materials

Suppliers

Depots

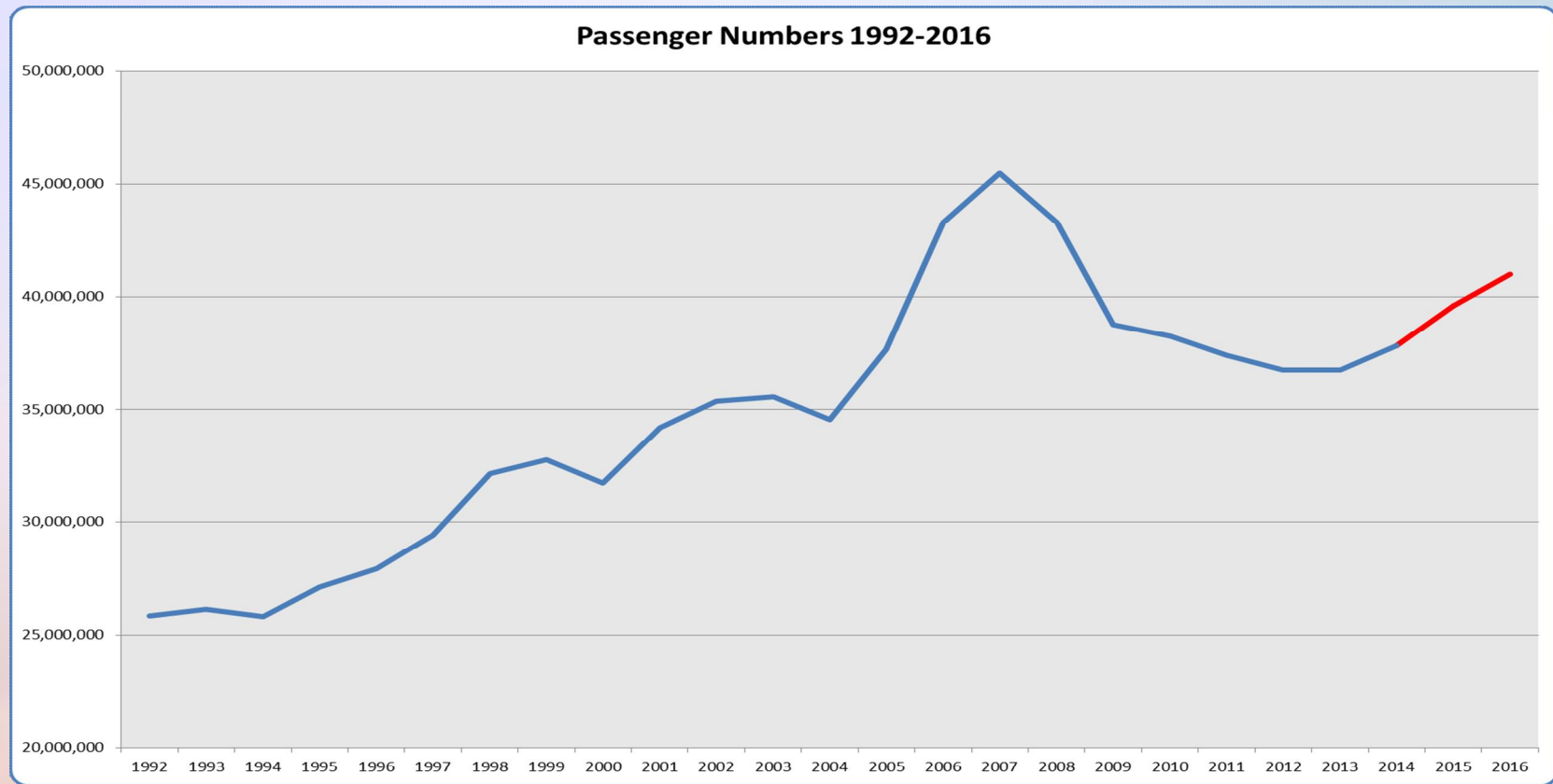
Culture

Infrastructure

Costs



The Roller Coaster





Iarnród Éireann **Doing more with less**

While protecting service levels, we have reduced:

€73m operating costs

€19m fuel costs through fuel efficiency

22% workforce, to lowest ever level

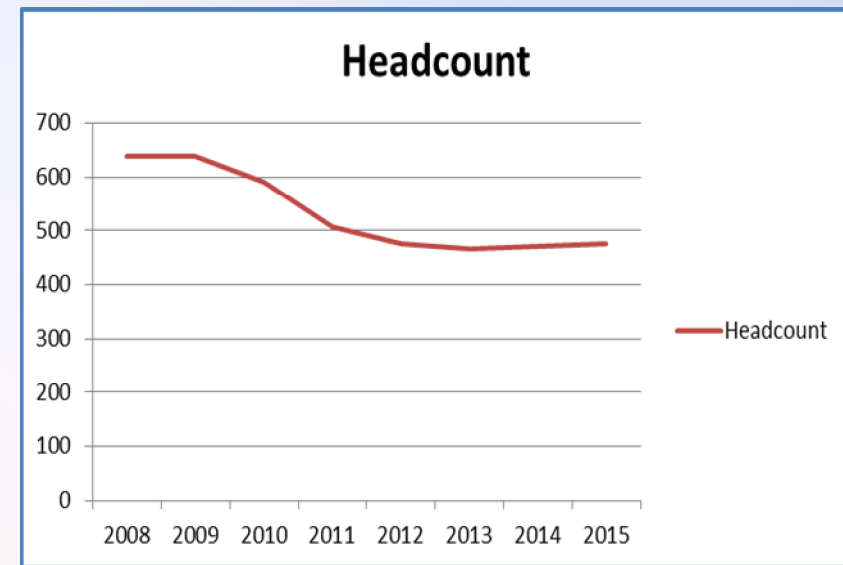
40% materials and services costs

23% operational costs per kilometre



People

- “ ZERO recruitment in 6 years
- “ ZERO compulsory redundancy - only voluntary
- “ Downsizing only – 22% so far
- “ Loss of knowledge
- “ Age profile++
- “ Problems ahead with skills shortages





People

- “ 2014 – 1st new Apprentices in 10 years – now recruiting 2015
- “ Graduate Engineers also in 2015
- “ Adult Apprentices programme
- “ Balance needed of outsourcing & internal work

Do well what you can do well



Apprenticeships 2015

Iarnród Éireann Irish Rail provides passenger and freight rail services as well as operating Rosslare Europort.

We are now seeking female and male applicants for the following apprenticeships: **Apprentice Fitter, Apprentice Diesel Mechanic and Apprentice Electrician** in the following locations: Dublin, Drogheda, Limerick and Portlaoise.



Our apprentices are trained to the highest possible technical standards. Working in an extremely safety conscious environment you will be working on some of the most modern fleets in Europe.

The competency areas for the role of an apprentice are:

- » Checking Skills and Concern for Quality
- » Handling Information / Ability to follow instructions
- » Work Organisation / Ability to plan sequence of operations in order to complete tasks
- » Problem Solving / Analytical Skills
- » Safety Consciousness
- » Technical Understanding and Manual Capability
- » Teamwork and Communication
- » Interest and Motivation

The Education Requirements for the role of an apprentice are:

Candidates must have obtained the following minimum standards at the time of applying:

Junior Certificate (Ordinary Level):

Grade C or higher at Ordinary Level in the Junior Certificate (or equivalent) in one sitting in the following subjects: i. Irish or English ii. Mathematics iii. Science* iv. Any two other subjects (Grade D or higher on higher level papers is acceptable).

*If you have not obtained the required grade in Science, the following is acceptable in: Junior Certificate - Technology, Art, Craft & Design, Technical Graphics, Materials Technology (Wood), Home Economics or Metalwork. **Foundation level in the Junior Certificate is not acceptable.**

Or:

Leaving Certificate:

Grade D or higher at Ordinary Level in the Leaving Certificate (or equivalent) in one sitting in the following subjects: i. Irish or English ii. Mathematics iii. Science Subject* iv. Any two other subjects *Agricultural Science, Applied Mathematics, Biology, Chemistry, Physics, Physics and Chemistry.

*If you have not obtained the required grade in any of the above Science Subjects the following is acceptable at Leaving Certificate Level: Art, Construction Studies, Design and Communication Graphics, Engineering, Home Economics and Technology.

Placements will commence in Autumn 2015 and applicants must be at least 16 years of age on or before the 1st August, 2015. Each candidate will be required to undertake aptitude tests and the results will be used to compile a shortlist for interview purposes.

Applications must be made online at www.irishrail.ie between 21st June and 12th July 2015.

Iarnród Éireann Irish Rail is an Equal Opportunities Employer.





Fleets

- “ No indigenous industry
- “ Some small fleets
- “ Japanese fleets a godsend!
- “ Reliability benchmarked well against UK
- “ Usual supply chain and same supplier issues as UK.....





Fleets – NEXALA RCM

- ” Remote Diagnostics system – Key tool
- ” 800 channels per vehicle every 2 seconds
- ” Monitors all systems and vehicle location
- ” Used by Tech, CTC, Ops, Investigations
- ” Diagnose & prevent failure & Service recovery
- ” Prevents +50% SAF & Delay mins on fitted fleet
- ” +Add ons – mileage track, location, engine hours, low rail adhesion locations

NEXALA

irishrail.nexala.com/fleet

Apps Nexala R2M Home - CME Map of electric car c... Ttunacz Google You+Nissan token LF-220 - Goog...

NEXALA R2M

Fleet Summary Unit Summary Fleet Location Event History Event Analysis Downloads

Headcode	Unit 1	Unit 2	Unit 3	Unit 4	Last Update Time	Location	Speed (mph)	Leading Vehicle	Live Faults	Live Warnings	Cab	General Warning	Safety	BECU	Power Pack	Battery Charger	HVAC	Doors	PAPIS
J221	22001	22002			28/09/2016 12:38:21	HSTON	6.0	22002	2	1									
D206	22004				28/09/2016 12:38:19	WFORD	0.0			3									
	22006				28/09/2016 12:38:18	LTCOTS	0.0												
	22006	22008			28/09/2016 08:38:36	HSTON	0.0	OFF											
	22006	22062			28/09/2016 10:44:62	HSTON	0.0	OFF											
J224	22007				28/09/2016 12:38:18	LTCOTS	0.0	22007		2									
A806	22009				28/09/2016 12:38:17	KDARE	36.0	22009											
A434	22010				28/09/2016 12:38:12	LWRKU	0.0	22010		1									
	22011				28/09/2016 12:38:11	LTCOTS	0.0		1	1									
	22012				28/09/2016 12:38:10	HSTON	0.0	OFF											
A934	22013				28/09/2016 12:38:19	WLGAR	115.7	22013		1									
U306	22014				28/09/2016 12:38:17	THRLS	88.0	22014		1									
U334	22015				28/09/2016 09:44:66	LTCOTS	0.0	OFF											
U334	22016				28/09/2016 12:38:17	KDARE	0.0	22016		1									
	22017				28/09/2016 12:38:17	CNLY	0.0												
P211	22018				28/09/2016 12:38:19	MOVIN	0.0	22018		1									
A802	22019				28/09/2016 11:16:42	SLIGO	0.0	OFF											
J130	22020				28/09/2016 11:26:68	DGHDA	0.0	OFF											
	22022				28/09/2016 12:10:06	WPORT	0.0	OFF											
	22023				28/09/2016 12:23:48	LTCOTV	0.0	OFF											
A403	22024				28/09/2016 10:47:06	HSTON	0.0	OFF											
	22025				28/09/2016 12:38:19	LTCOTS	0.0			1									
J201	22026				28/09/2016 12:38:19	HTOWN	0.0	OFF											
A801	22027				28/09/2016 12:38:17	CLARA	127.4	22027		2									
A806	22028				28/09/2016 12:38:13	CNLY	0.0	22028		3									
A212	22029				28/09/2016 12:38:19	PTATN	131.7	22029		1									
A711	22030				28/09/2016 12:38:19	TWORE	130.4	22030											
	22031				28/09/2016 12:38:11	HSTON	0.0		2										
J204	22032				28/09/2016 10:43:30	LTCOTS	4.6	OFF											
	22033				28/09/2016 12:38:18	LTCOTS	0.0			2									
I334	22034				28/09/2016 12:37:14	HSTON	0.0			1									
I336	22036				28/09/2016 12:30:26	HSTON	0.0	OFF											
A208	22038				28/09/2016 12:38:19	CORK	0.0			1									
A126	22037				28/09/2016 12:38:19	HTOWN	34.1	22137											
A303	22038				28/09/2016 11:46:30	HSTON	0.0	OFF											
	22039				28/09/2016 12:38:18	LTCOTV	0.0			3									
A611	22040				28/09/2016 12:38:10	WPORT	0.0	22140											
C814	22041				28/09/2016 12:38:16	DGHDA	0.0	22141											
A304	22042				28/09/2016 12:38:19	KLRNY	93.9	22342		1									
A609	22043				28/09/2016 12:38:10	RLEPT	0.0												
A307	22044				28/09/2016 12:38:19	MLLOW	64.9	22344		1									
A607	22046				28/09/2016 12:38:19	ETOWN	103.4	22246		2									
A608	22046				26/09/2016 22:27:18	LFORD	0.0	OFF											
	22047				28/09/2016 12:11:26	GALVY	0.0	OFF											
I248	22048				27/09/2016 16:24:14	ICORE	0.0	OFF											
	22049				28/09/2016 10:30:64	ICORE	0.0	OFF											
A603	22060				28/09/2016 12:38:22	LTCOTV	0.0												
D207	22061	22021			28/09/2016 12:38:19	HAFEP	106.2	22361		1									
A804	22062				28/09/2016 12:38:17	HSTON	0.0	22262		2									
P508	22063				28/09/2016 12:38:21	WISWAY	0.0	22363											
P210	22064				28/09/2016 12:38:14	HSTON	0.0												
J230	22066				28/09/2016 12:38:18	PTUSE	0.0			1									
A606	22066				28/09/2016 12:38:21	HSTON	0.0	22366											
P684	22067				28/09/2016 11:43:17	CNLY	0.0	OFF											

Copyright (c) Nexala Technologies

LIVE EVENTS Category: All

- Speed Sensor 1 Fault A3 22301 0 seconds ago
- Train Radio Comm Fault 22318 21 seconds ago
- BECU - PB not showing as applying 22255 51 seconds ago
- Power Pack - Adjacent AC power ESK Fault 22811 56 seconds ago
- Power Pack - Gear Red Alarm only 1 Trans signal avlb 22402 4 minutes ago
- TMDS Frozen 22207 7 minutes ago
- Power Pack - PPCOS Active 22307 8 minutes ago
- Train Radio Comm Fault 22302 8 minutes ago
- TMDS Frozen 22331 10 minutes ago
- TMDS Frozen 22131 10 minutes ago
- TMDS Frozen 22333 13 minutes ago
- TMDS Frozen 22133 13 minutes ago
- Battery Charger - Comm fault 22401 14 minutes ago
- HVAC - Inverter 1 Fault 22228 20 minutes ago
- PAPIS - CCTV Failure 22328 20 minutes ago
- Doors - EDCU Comm Fault 22428 21 minutes ago
- BECU - PB not showing as applying 22252 24 minutes ago
- BECU - PB not showing as applying 22210 25 minutes ago
- PAPIS - CCTV Failure 22821 26 minutes ago
- BECU - PB not showing as applying 22334 27 minutes ago
- Train Radio Comm Fault 22311 31 minutes ago
- Toilet out of order 22313 32 minutes ago
- BECU - PB not showing as applying 22203 48 minutes ago
- Power Pack - ELMS Active 22339 49 minutes ago
- Battery - Battery charger fault >5kph 22303 57 minutes ago
- Battery Charger - Fault 22303 58 minutes ago
- Train Radio Comm Fault 22316 59 minutes ago
- PAPIS - CCTV Failure 22229 1 hour ago
- HVAC - Heating setting fault 22345 1 hour ago
- HVAC - Cooling setting fault 22345 1 hour ago
- Train Radio Comm Fault 22314 1 hour ago
- Train Radio Comm Fault 22327 2 hours ago
- Pilon PC - Time Setting Fault 22336 2 hours ago
- Battery Charger ACPT Card Fault 22451 3 hours ago
- Train Radio Comm Fault 22317 4 hours ago
- PAPIS - CCTV Failure 22844 4 hours ago
- Pilon PC - Time Setting Fault 22342 6 hours ago
- Door D - Isolated 22325 6 hours ago
- PAPIS - CCTV Failure 22739 6 hours ago

RECENT EVENTS

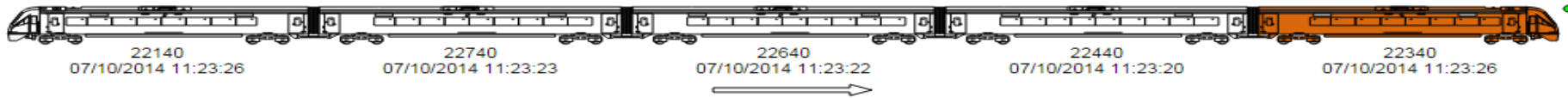
NEXALA Cab View



22040

Unit Detail Channel Data Data View Location Cab Counters

Timestamp: 07/10/2014 11:23:26 Headcode: D205 Leading Vehicle: 22340
 Location: MONVN Unit Number: 22040 Faults: 0
 Diagram: D205 10:20 HSTON - PTLSE 11:27 Speed: 14.9 km/h Warnings: 1



Unit 22140 22740 22640 22440 22340

Live Events

Category : All

	Date Occurred	Headcode	Vehicle	Code
●	07/10/2014 05:14:12	I400	22340	Power Pack - PPCOS Active

Recent Events

Category : All

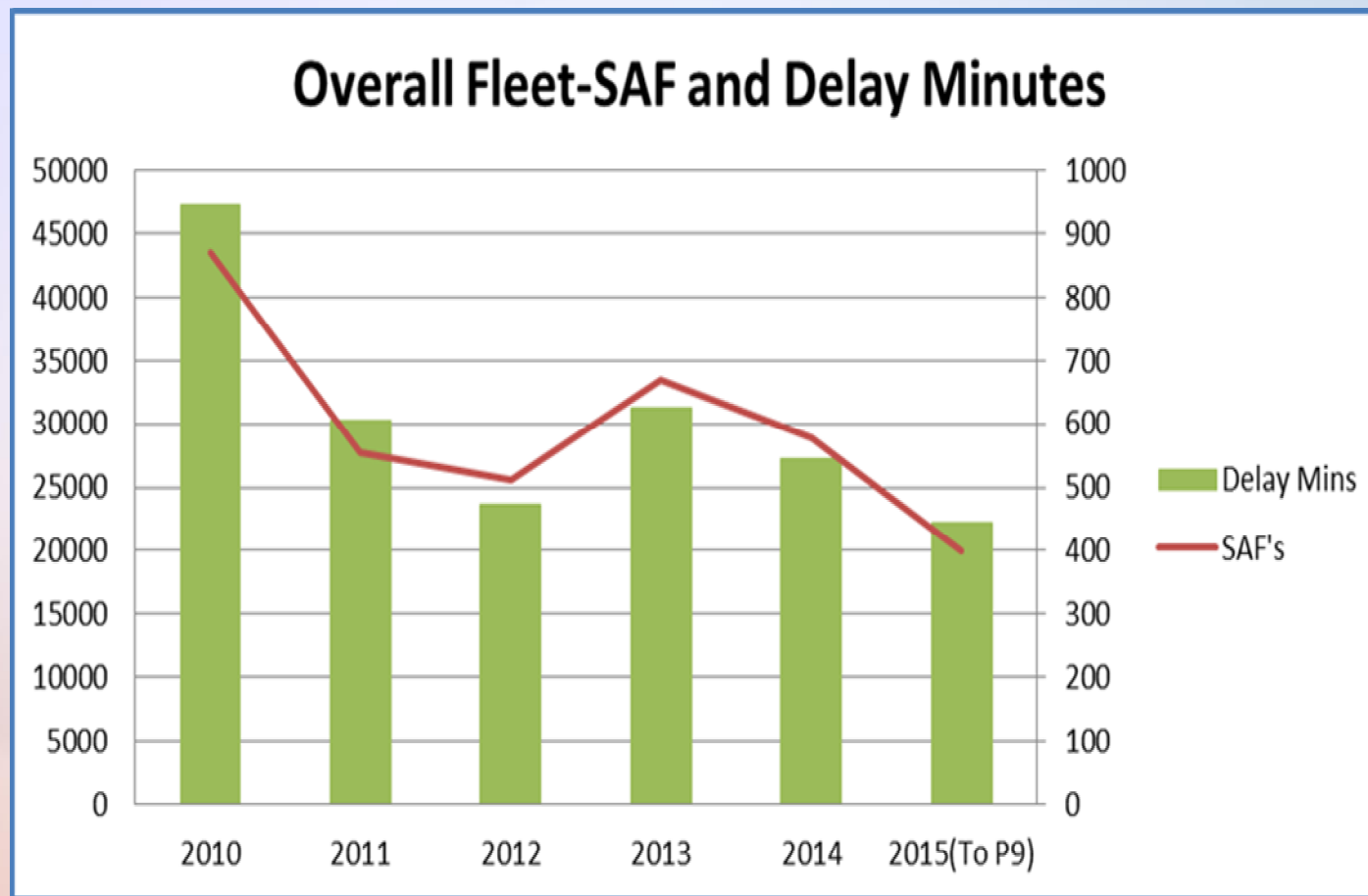
	Date Occurred	Headcode	Vehicle	Code
●	07/10/2014 07:24:22	A405	22440	HVAC - Interior Sensor Fault
●	07/10/2014 07:23:48	A405	22140	Battery - Contactor Open
●	07/10/2014 07:22:41	A405	22440	HVAC - Interior Sensor Fault
●	07/10/2014 07:22:38	A405	22140	Battery - Contactor Open
●	07/10/2014 07:19:21	A405	22640	Power Pack - Adjacent AC power ESK Fault
●	07/10/2014 07:19:19	A405	22440	HVAC - Interior Sensor Fault
●	07/10/2014 07:16:29	A405	22440	HVAC - Interior Sensor Fault
●	07/10/2014 07:04:05	A405	22740	Power Pack - Constant running
●	07/10/2014 07:04:03	A405	22440	Power Pack - Constant running
●	07/10/2014 06:03:58	I400	22440	HVAC - Interior Sensor Fault
●	07/10/2014 05:14:41	I400	22140	BECU - PB not showing as applying

Live Restrictions

Recent Restrictions



Fleets – Performance





Fleets – Fleet safety

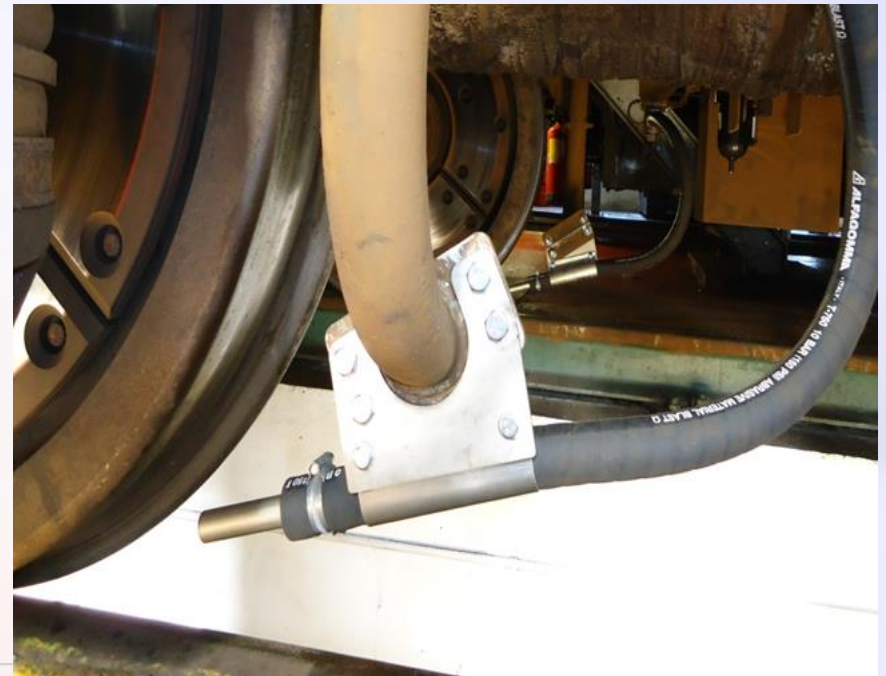
- “ Legacy issue - axle bearing failures
- “ New acoustic monitoring equip x 3





Fleets – Fleet safety

- “ Legacy issue – Sander Performance
- “ Implemented RSSB Recommendations





Fleets – SPADs

- “ Legacy issue – Start against signal SPADs
- “ Implemented DRA in 2015





Fleets – Loco structure

- “ Legacy issue – Heavy corrosion of 1976 GM fleet
- “ Created specialist trained team to address





Materials

- “ Small fleets and bespoke fleets = rare equipment
- “ Long lead times, high costs
- “ Availability & Reliability issues
- “ “Robbing” of components
- “ Electronic kit – often no fault found

Solution - Create in house test & repair facility



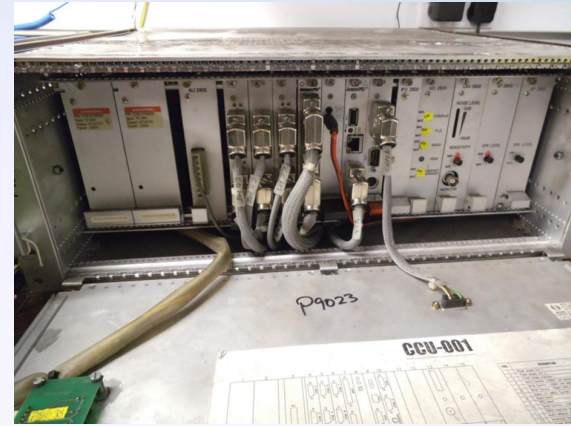
Materials

- “ IE facility in place to test and repair high value components
- “ OTMR, CCTV, PIS, TMDS etc
- “ Expanded premises and now 5 x Technicians (OEM accredited)
- “ Can repair most items
- “ Short lead time
- “ Saves €2m+ pa on materials costs

HASLER*ail*

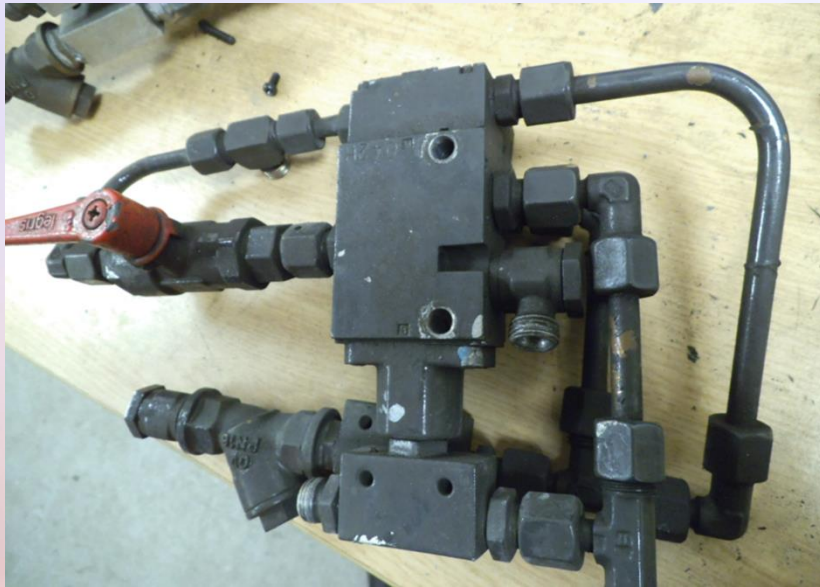


Materials

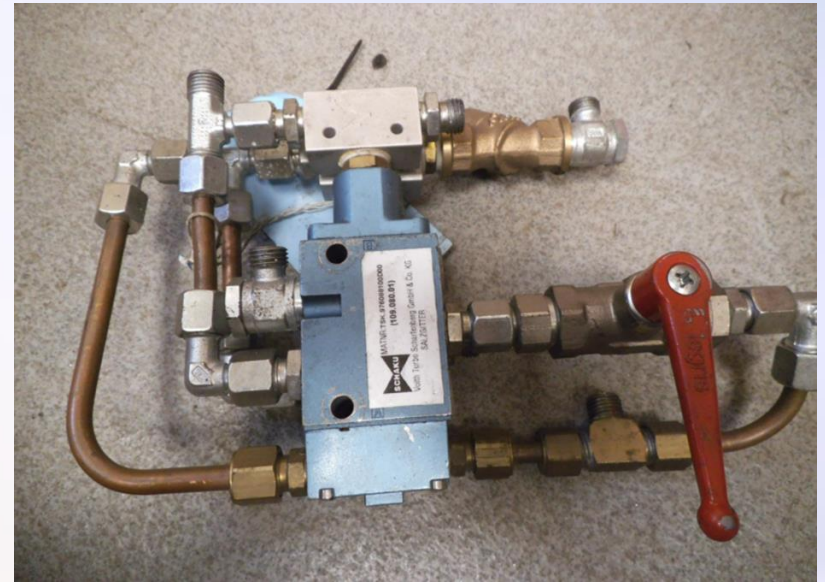
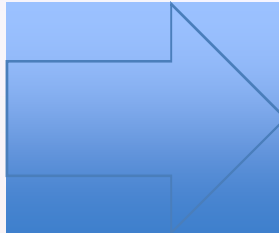




Materials



Before



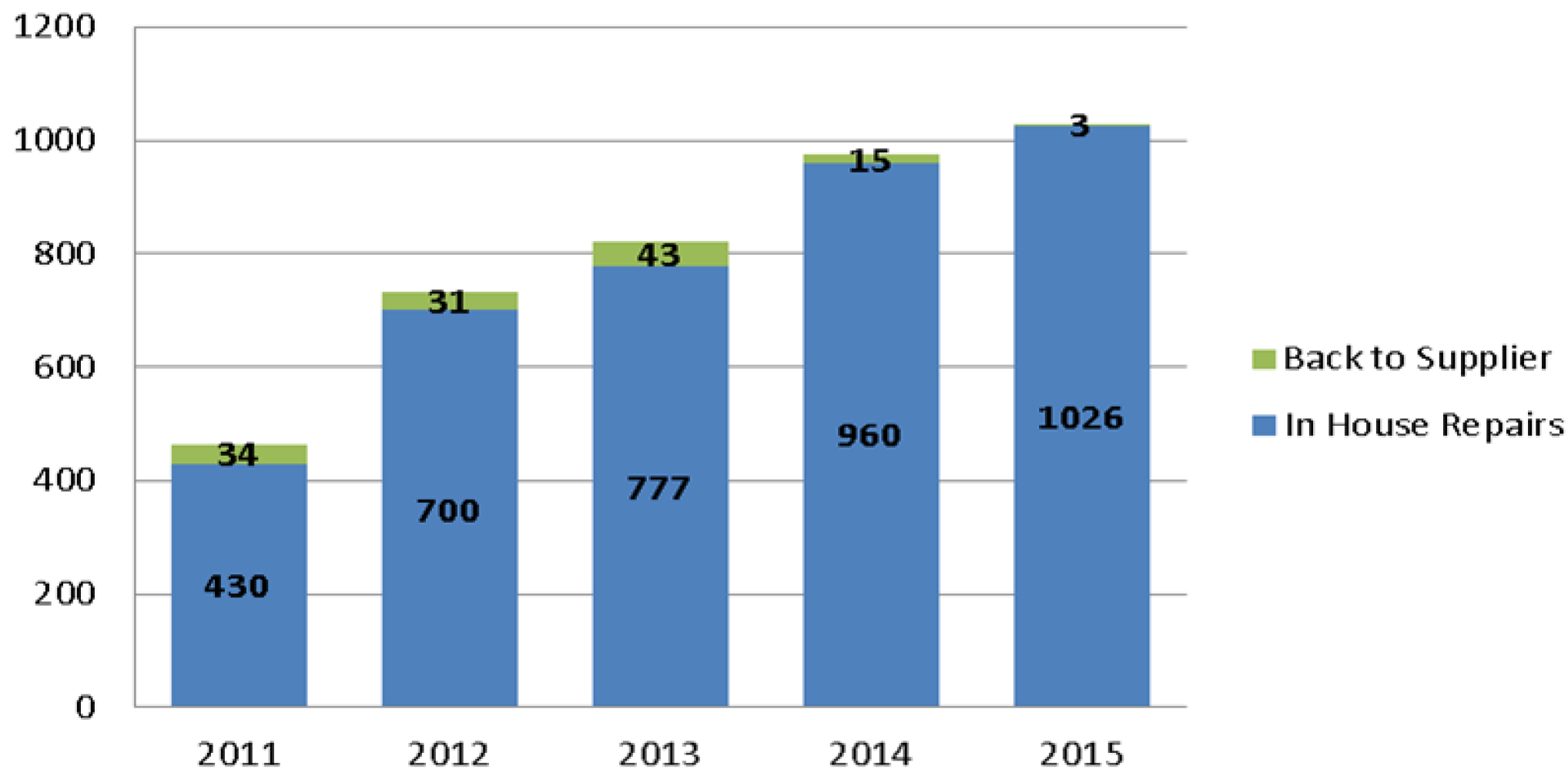
After



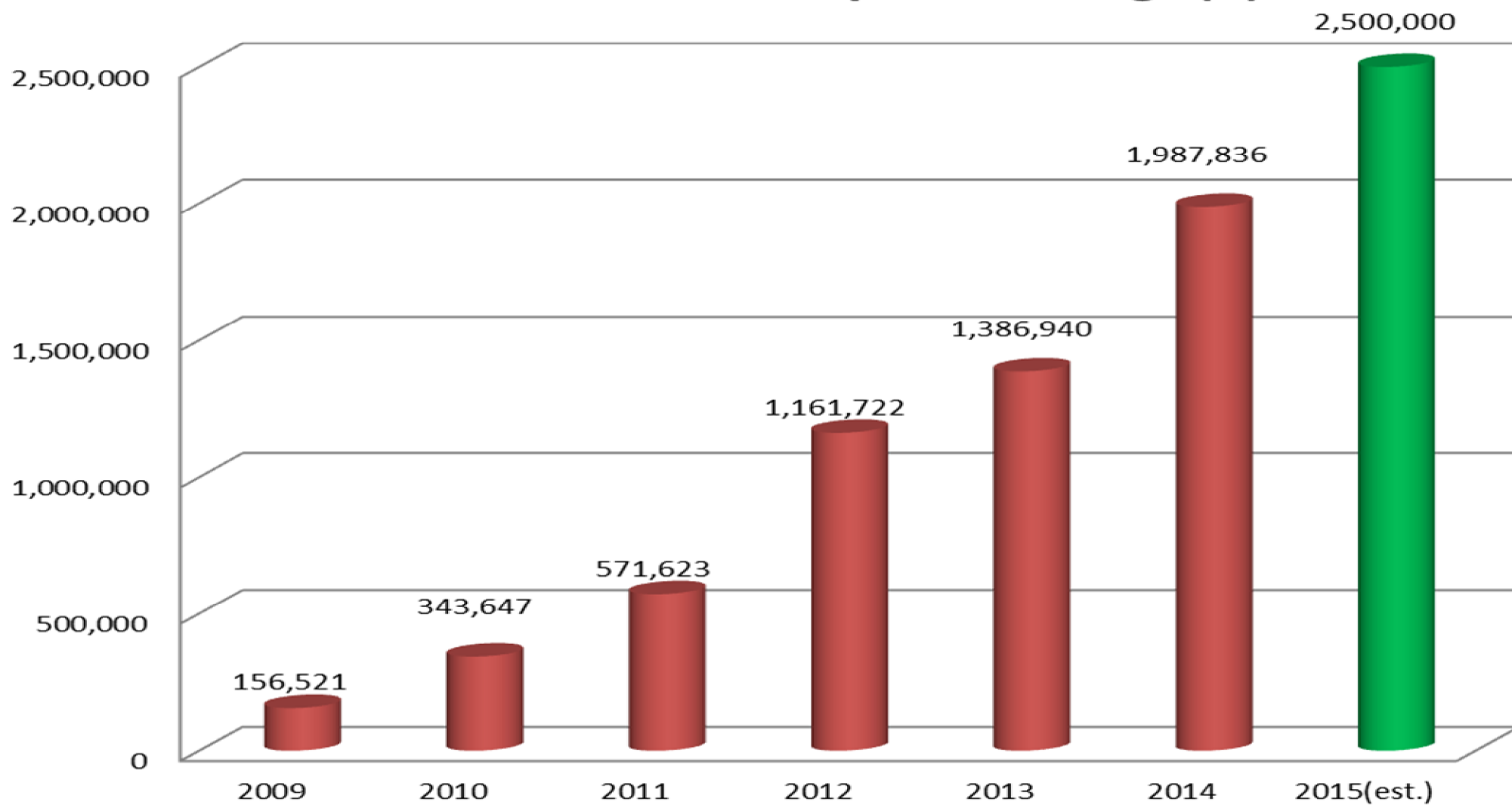
Current facility



In House Electronic Repairs-Success Rate



In House Electronic Repairs-Savings (€)





New expanded facility – under construction





6 x custom work stations ESD rated



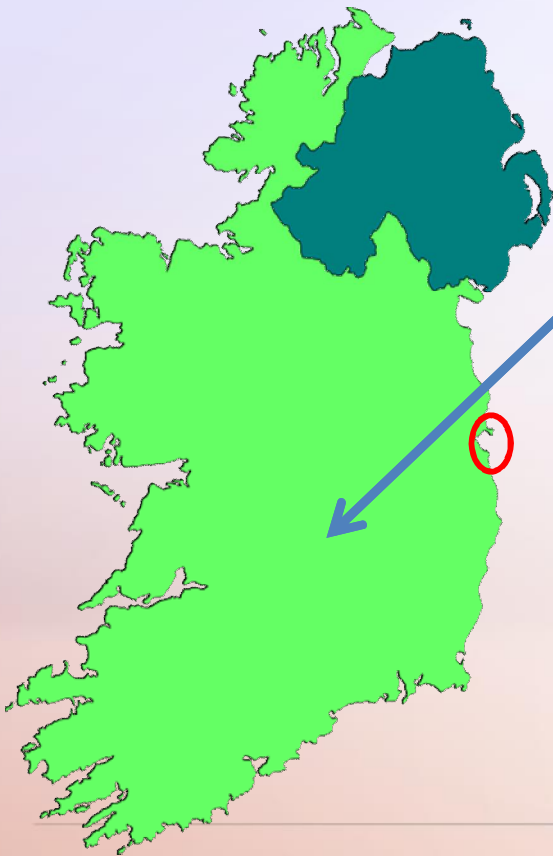


New facility

- “ Complete Oct 2015
- “ Cost €50k
- “ Future expansion



Suppliers - case study Portlaoise Depot



HYUNDAI
Rotem

LH
A part of the **Wabtec** Group

GLOBAL RAIL
SERVICES LTD

Iarnród Éireann
Irish Rail

DRI
transport vehicle parts & services

Faiveley
TRANSPORT

mtu

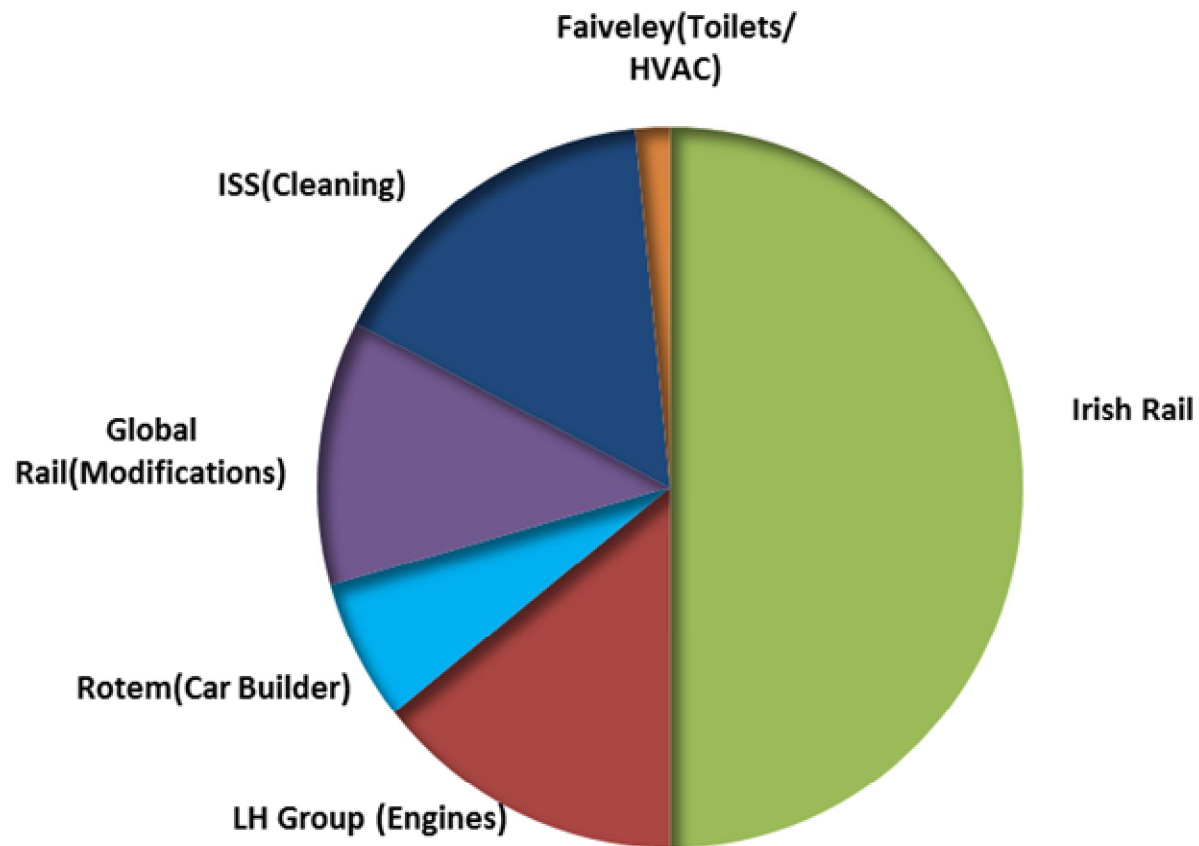
ISS

South Coast Diesels
ENGINE REBUILD SPECIALISTS

VOITH

Iarnród Éireann
Irish Rail

Suppliers - case study Portlaoise Depot





Suppliers - case study Portlaoise Depot

- “ Intercity DMU facility
- “ 234 vehicles in 63 sets
- “ Mix of IE staff and contract staff
- “ Complex trains especially powerpack raft
- “ Remember “do well what you can do well”





Suppliers - case study Portlaoise Depot

- ISS – cleaning
- Voith – couplers
- Global – OEM support
- Hyundai – OEM
- Doors, Toilets, HVAC
- LH Wabtec - Powerpacks maintenance



VOITH



HYUNDAI
Rotem

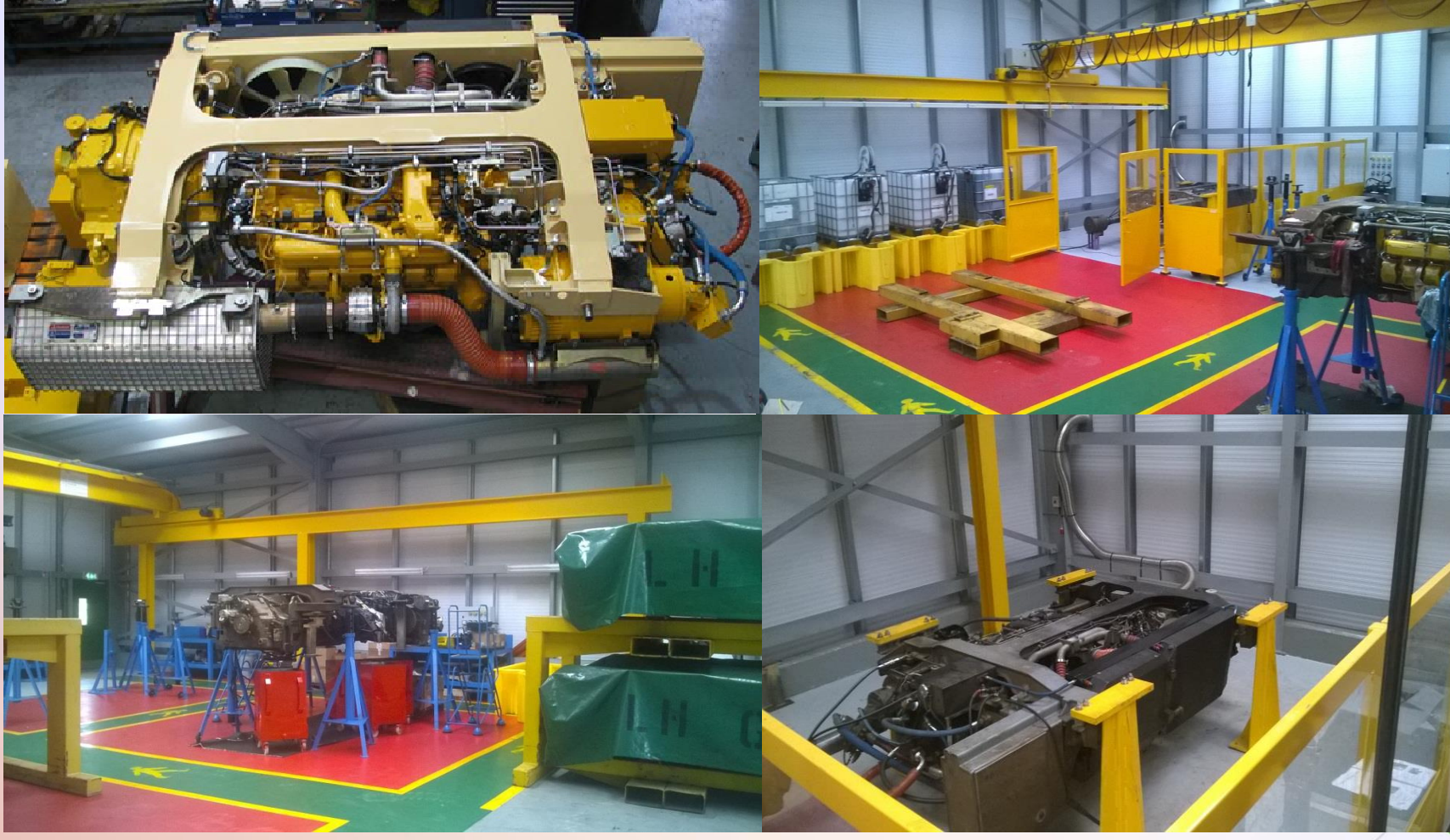




Suppliers - case study Portlaoise Depot

- “ Powerpacks difficult, complex and expensive to maintain reliably
- “ Outsourced to LH Wabtec for all maintenance & overhaul on €€ per operating hour basis
- “ Deal includes enhancements & improvements
- “ Also a local overhaul facility

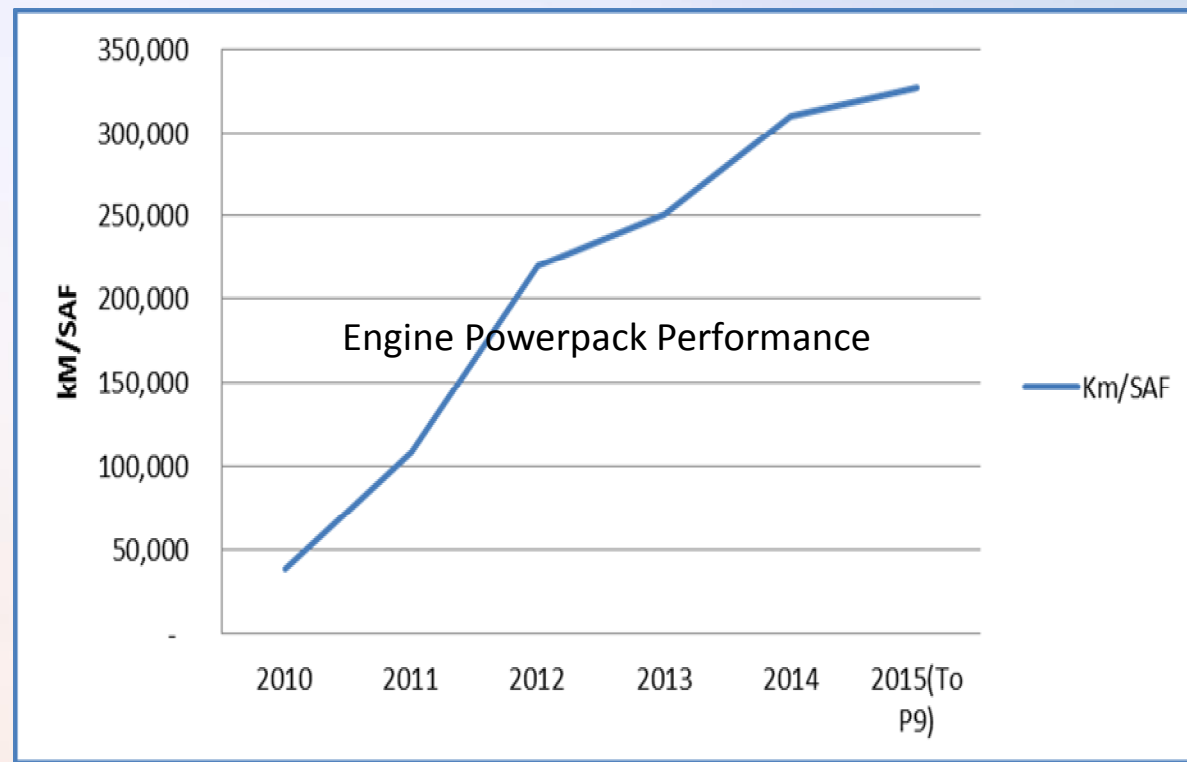
Powerpack light overhaul facility





Suppliers - case study Portlaoise Depot

- “ Supplier handles all maintenance and overhaul
- “ Specialist expertise & support
- “ Performance result “step change” improvement
- “ Costs controlled!



Suppliers - Safety Management

- “ Suppliers are controlled by SMS standard
- “ Reference schemes:



Reference No.	CME-SMS-009
Version	3
Operative Date	11/11/2013
Status	Live
Prepared by	Louis Gilvarry
Checked by	Damien McConnell / Alan O'Connell
Approved by	Peter Smyth

CME DEPARTMENT

SAFETY MANAGEMENT STANDARD

CME-SMS-009

Approved suppliers of Safety Critical equipment

This CME Departmental Standard sets out the requirements for the Approval of Suppliers of Safety Critical Equipment within the CME Department.

This CME Department Standard is mandatory.

The principles in this Standard are approved by the Head of Department and therefore constitute mandatory standard practices, which apply throughout the CME Department.

Signed

Chief Mechanical Engineer

This standard, along with all CME Department Standards, is available on the CME Web Site. Electronic copies of the Standards are controlled and live. Holders of printed copies of the Standard are responsible themselves for ensuring that they have the most up to date version as appropriate.

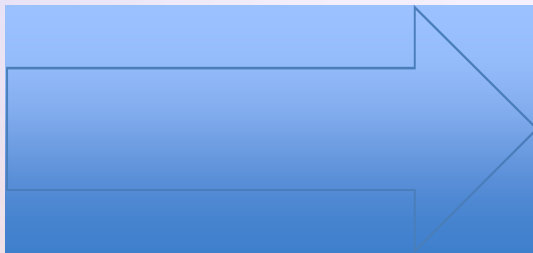
This is a Controlled Document, as presented on-line.

It is Uncontrolled if printed, unless identified as a
"Controlled Copy" on all pages.



Culture

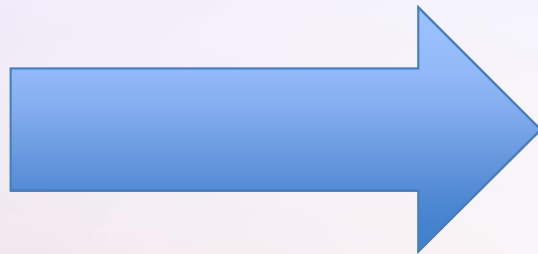
To avoid this..





Culture

You need this:



A good, practical and well embedded SMS



Reference No.	CME-SMS-001
Version	6
Operative Date	11/08/2014
Status	Live
Prepared by	U. Clohessy
Checked by	G. Daniels
Approved by	P. Smyth

CME DEPARTMENT SAFETY MANAGEMENT STANDARD

CME-SMS-001 CME Safety Management System

This CME Department Standard sets out the requirements for Safety Management within the CME Department.

This CME Department Standard is mandatory.

The principles in this Standard are approved by the Chief Mechanical Engineer and therefore constitute mandatory standard practices, which apply throughout the CME Department.

Signed

Chief Mechanical Engineer

This standard, along with all CME Department Standards, is available on the CME Web Site. Electronic copies of the Standards are controlled and live. Holders of printed copies of the Standard are responsible themselves for ensuring that they have the most up to date version as appropriate.

This is a Controlled Document, as presented on-line.

It is Uncontrolled if printed, unless identified as a
"Controlled Copy" on all pages

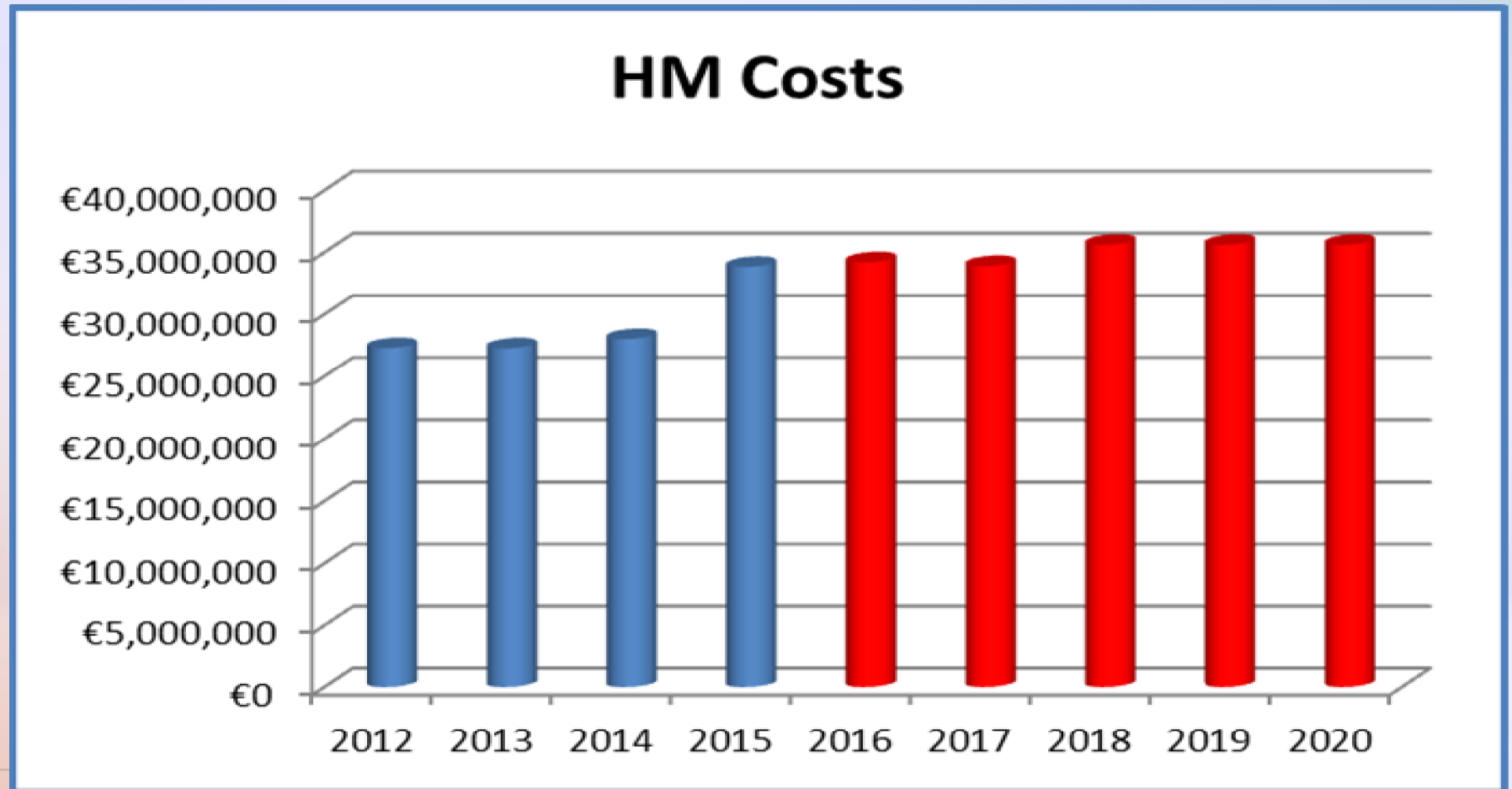


Costs

- “ Cost reductions driven by application of LEAN
- “ 30% cost reduction in Engineering in 5 years
- “ Reductions in maintenance, fuel, traction electricity – but:
- “ Modern trains are expensive to maintain
- “ Stakeholder management



Costs – Heavy Maintenance 2012 - 2016



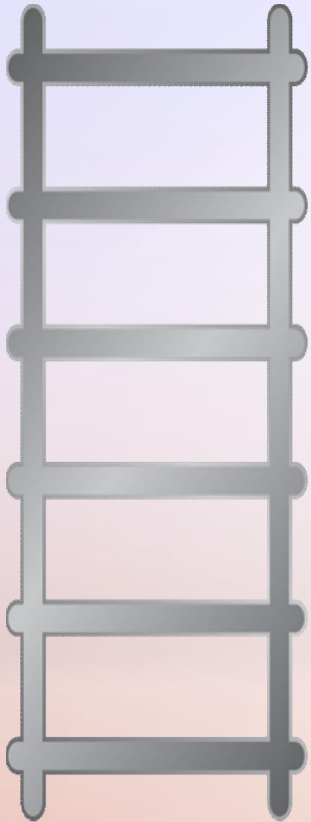
Iarnród Éireann

Summary





Iarnród Éireann Summary



Iarnród Éireann is:

- “ Delivering **quality, safe, customer-focused, sustainable services** which benefit our economy, communities and the customers we serve.
- “ Passenger and freight **growth** are returning,
- “ Investment for rail services will deliver **real economic return** for Ireland.
- “ We remain ambitious for the future role of rail for the benefit of **our economy** and **our environment**
- “ **Legacy system issues** can be identified and addressed