

South West Centre-

Electrification Factory Train, lecture – 14 October 2013, Steam Museum, Swindon, 17.00 to 19.00

North West Centre

The Intercity Express Programme (IEP), lecture – 12 November 2013, Manchester Metropolitan University, 18.30 to 19.30

Scottish Centre

Rail Technical Strategy, lecture - 19 September 2013, Caledonian University, Glasgow, 17.30 to 19.30

Midlands Centre

London Midland: Project 110, lecture – 17 September 2013, Derby Roundhouse, 17.15 to 19.30

North East Centre

On Vehicle Compressors – New Technology & Problem Solving, lecture – 17 September 2013, Wabtec Rail, Doncaster, 18.30 to 20.30

Railway Division Chairman's Address 2013: Asset Management

**Presented by Chris Moss,
Consultant, Relationship
Development, Eversholt Rail**

Tonight

- The reason I joined British Rail
- The railway I joined
- The training and early career
- How Privatisation changed the industry
- Asset Management and challenges for the industry
- This industry is a great place to work!

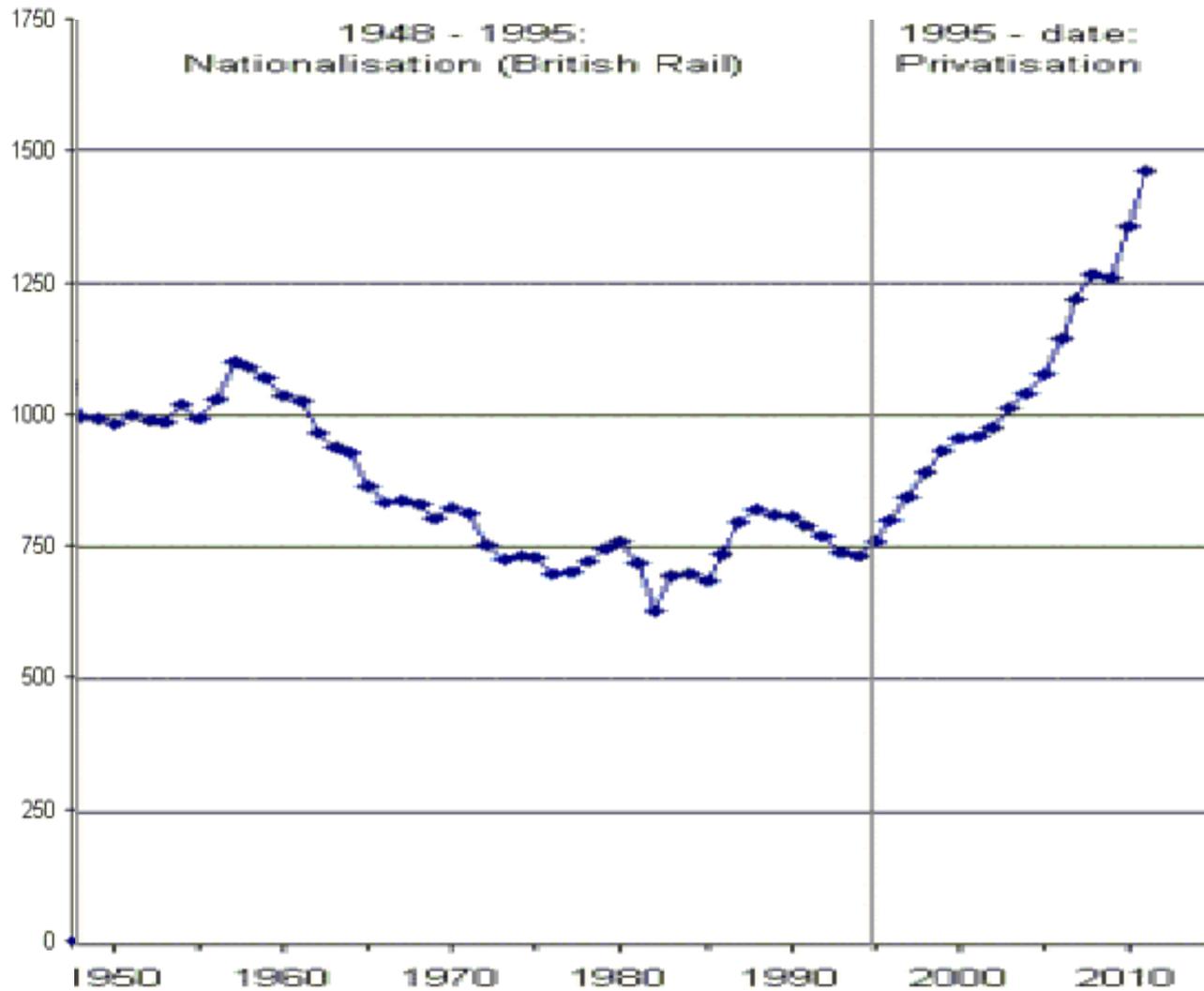
Why did I join the railway?

- I was a commuter to school
- Railways were in my blood, but so was aviation
- Crucially, I would not go to university unless I was sponsored

The Railway I Joined

- Perceived as a problem
- Continually reorganising
- Rolling Stock in transition
- No computers
- Typing pool
- Alcohol at lunchtimes

Passenger Numbers by year



Eastleigh Works



Selhurst Repair Shop



Brake Testing



Brake Testing



Early Career



Early Career



Partial fleet fitment of k Brake Blocks

- Fitment of 10x 4 car cl411 following business case approval
- Drivers were briefed re the nature of the braking
- Results were, I believe, inconclusive (left Southern around this time)

Bounds Green and Commercial awakening



Bounds Green



Bounds Green



A-8 WHEEL 43046 26/4/87
BN

Brighton Depot



Brighton Depot

- There are many ways at improving reliability and availability. Not all include throwing cash at the problem.
- 2 sub classes of buffet car units mk4 and mk6 motor bogies.
- Mk4 bogied unit C4 -100k mls
- Mk6 bogied unit C4 -160k mls

Brighton Depot

Concerns/ Conflicts

- Complaints from Buffet staff re rough riding started circa 75k miles on Mk4 bogied units
- Side jobs at Selhurst Repair shop cost money and loss of unit for several days
- Bring forward the C4- no cost provision
- Do nothing- not customer friendly

Brighton Depot

Solution

- Swop the buffet cars out of the units with Mk4 bogies with a trailer coach from a Mk6 fitted unit.

Saved money, improved availability and gave the customer a better deal.

On Call

- There is at least one day in a career which one will never forget.
- Mine was Purley
- 4th March 1989 approximately 1325

Purley Accident 4/3/1989







Privatisation



Privatisation

There was time to plan for a fleet in an holistic way and become asset mangers. This resulted in:-

- Re planning maintenance periodicities
- Reduction in maintenance costs
- Taking a realistic/ affordable approach to eg corrosion issues using the RSSB devised 'How safe is safe enough'

Privatisation

Management of risk

- By investing in 'at risk' or under performing fleets
- Huge time investment into managing suppliers
- Investment in making specifications fit for purpose
- Reinventing effective 'Design Authority'

Privatisation

- I learnt to understand the cost of money
- The importance of the rating agencies in a company's cost of money
- In BR it was about 'cost control', now it is about the bottom line and cash flows
- Its about keeping within the ratios of the governance KPIs and this can affect how much money can be borrowed to invest
- EBITDA
- But above all it's the amount of information required by the investors

3 Engineering Concerns for this industry

- Design Authority or rather the lack of it
- Lack of consistent workload and of planning within the supply chain leads to safety risks
- Lack of flexibility in the rolling stock market

Design Authority

Design Authority is defined in GE/GN 8565 (Issue 1:June 2004)

- “Provides guidance to the manufacturers, asset owners and operators on the concept of a design authority and the four underlying competences fundamental to asset management”

Design Authority

The Four Competences are:-

- The know why of a system
- Retention of information (Technical File required by TSIs)
- Ability to make an informed judgement on the validation of technical change
- Management of configuration levels

Design Authority

- British Rail was the asset manager and design authority for all its fleets of trains.
- Post privatisation the Roscos assumed that role to a greater or lesser extent filling the vacuum.
- Much original knowledge has been lost

Design Authority

At Eversholt/HSBC Rail we managed:-

- the records and drawings
- modifications and associated changes
- the configuration of each fleet

as part of our duty under section 6 of the H&S Act.

- We relied heavily upon the Tesco's for technical advice, historical knowledge and some original design know how and why.

Design Authority

Examples of poor or lack of Design Authority and their outcomes

- Loss of Cardan Shaft at Durham
- Balcombe Tunnel Incident
- Nimrod Afghanistan

Design Authority

- On 10th April 2011 unit 142045 lost its cardan shaft at speed while passing through Durham



Design Authority

RAIB findings:-

- Three underlying factors
 1. The original product manual for the overhaul of RF420i final drives was not available to the TESCO
 2. The maintainer had no access to original design drawings
 3. The maintainer did not assess the design changes it had made it made to final set up

Design Authority

RAIB made 3 recommendations

- OEMs should provide sufficient maintenance documentation to owners
- Any changes in design should be fully assessed
- Key design information should be sourced and made available to maintainers (also applicable to other owners and fleets of trains)

Balcombe Tunnel



Design Authority

Extracts from RAIB's report:-

- Network Rail's structures management engineers lacked information on the design of the water catchment trays, because neither the Health and Safety file nor construction records were available
- As a consequence, SME1 did not have the information required to fully understand how the structure was supported, or provide guidance on whether the trays could be safely walked on. This had a direct effect on the examination regime.

Balcombe Tunnel

- Network Rail's asset knowledge was also affected by the non-availability of some examination reports which were either outstanding at the time of the handover between Atkins and Amey in 2009, or not uploaded correctly onto Network Rail's reports database.

Design Authority

The loss of the Nimrod in Afghanistan 2006



Design Authority

- The Findings:-
- Fundamental flaws in the Nimrod Safety Case, which was drawn up between 2001 and 2005, had missed existing dormant design flaws.
- Safety Case was fatally undermined by a general malaise and widespread assumption that the plane had flown for 30 years and was safe.

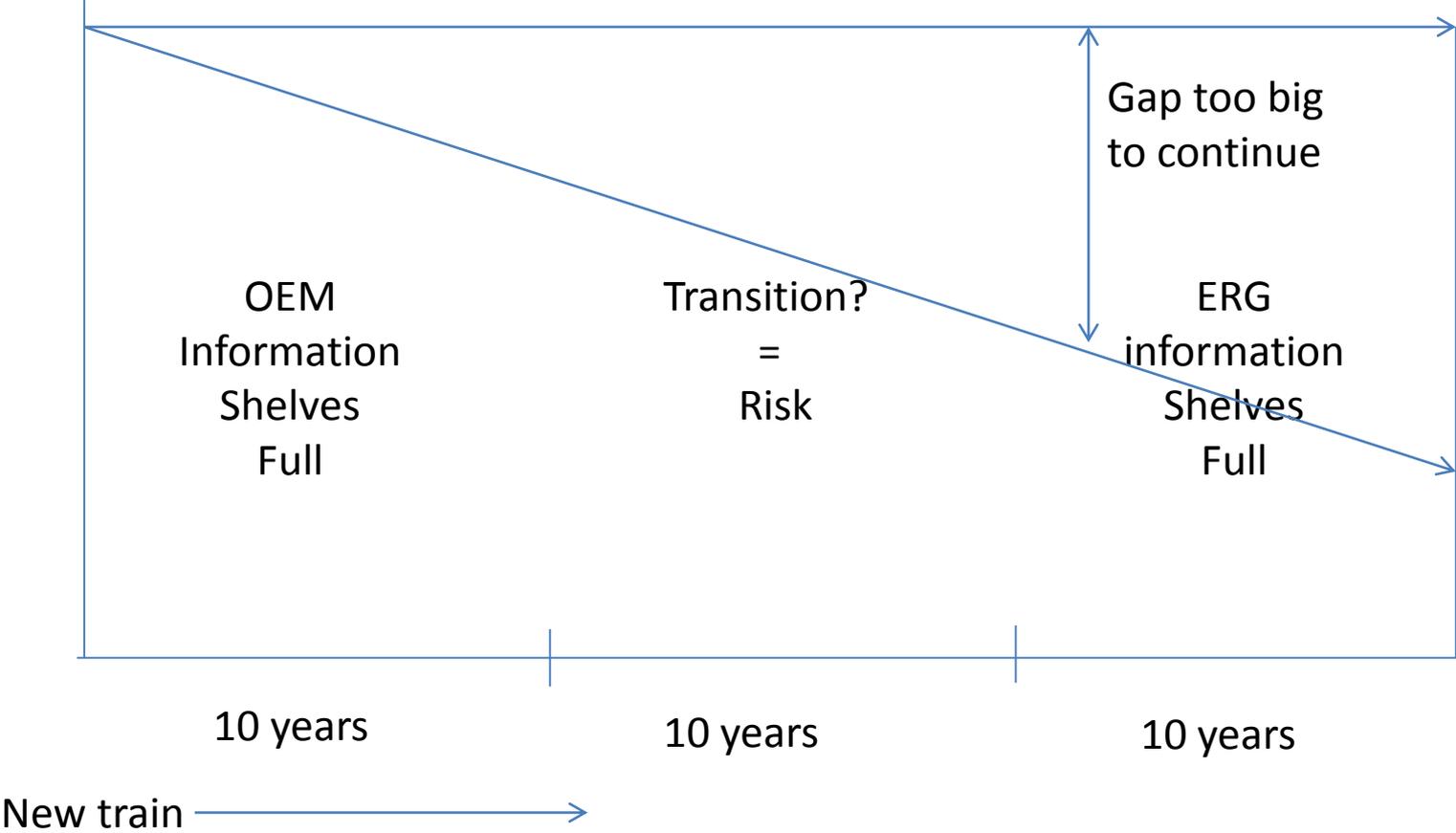
Design Authority

- The risks for today's railway are being managed by:
- Roscos or others acting as effective 'Design Authority' for pre 1994 fleets
- OEMs of modern rolling stock are involved either through a TSA or TSSSA

Design Authority

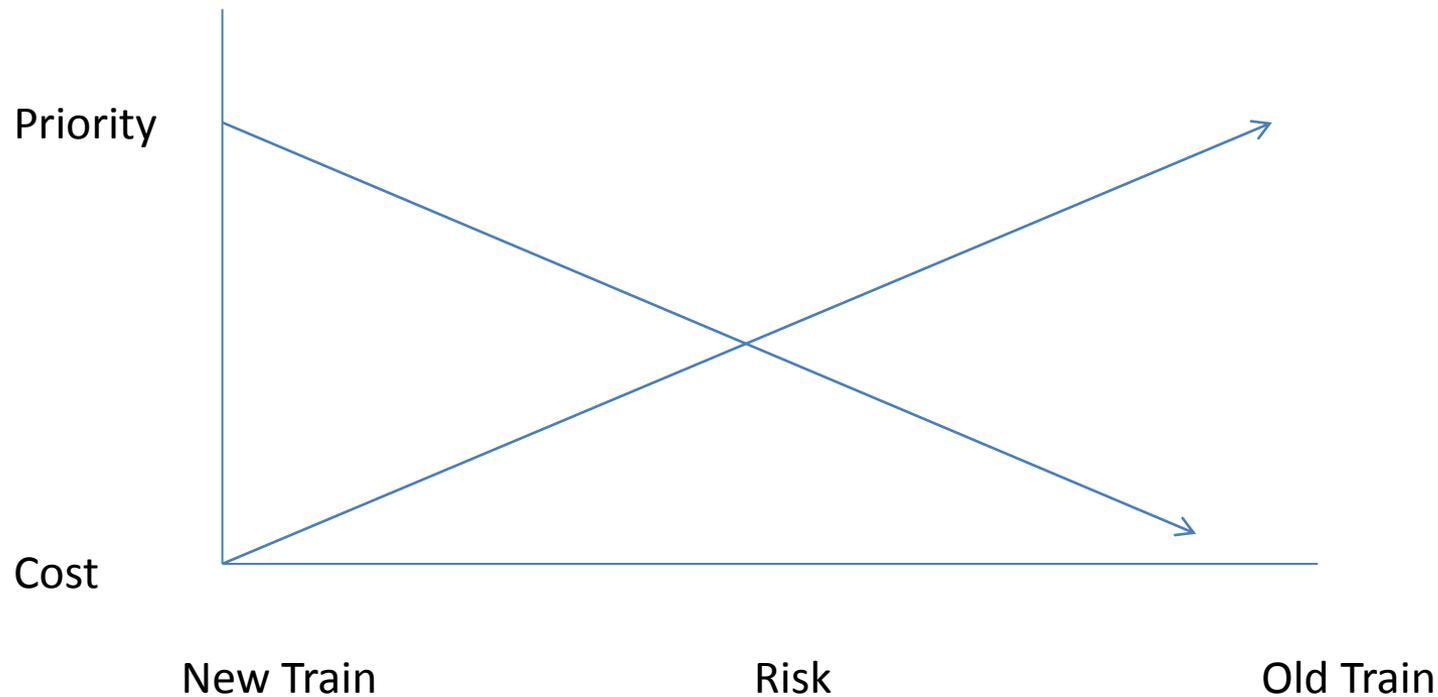
- In Aviation OEMs are required by law to be the Design Authority
- In rail technology has changed since privatisation
- Today's control and brake systems are computer based
- Only the OEM (system integrator and software writers) have the source key for these systems

Design Authority



Design Authority

- Maintain OEM priority- incentivise
- Keep costs manageable or legislate



Design Authority

- Risks and issues will arise in modern fleets over the next 5-10 years through obsolescence.
- Currently some OEMs do not wish to be the Design Authority for life of their product, it is not in their business model.

Design Authority

What is the life of a 'fly by wire' train unless the OEM fully supports it throughout its life?

– Increased costs for industry

Dangers inherent in the supply chain

Supply Chain is very different in 2013 to 1994

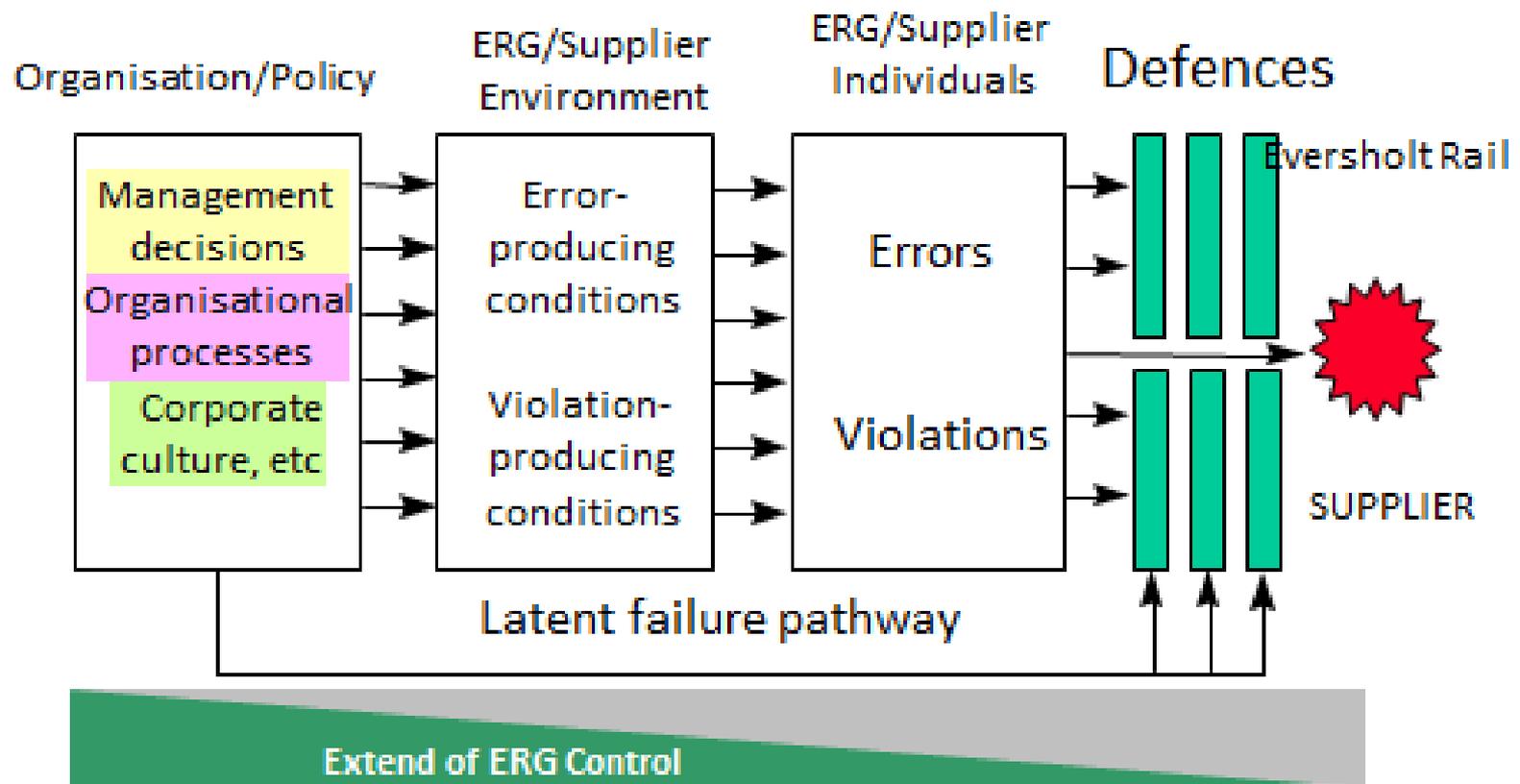
- Fewer suppliers
- Economic pressures
- Time pressures
- Staff skills are different
- Loss of knowledge
- Work specifications need to be more specific and detailed. (brings risks itself)
- More global

Asset Management

- When subcontracting work there are always pressures on both sides of the contractual boundary.
- Organisational cultural factors affect the outcome of contracts
- Preparation time is essential (more now than in past)
- Agreeing what success means to both parties

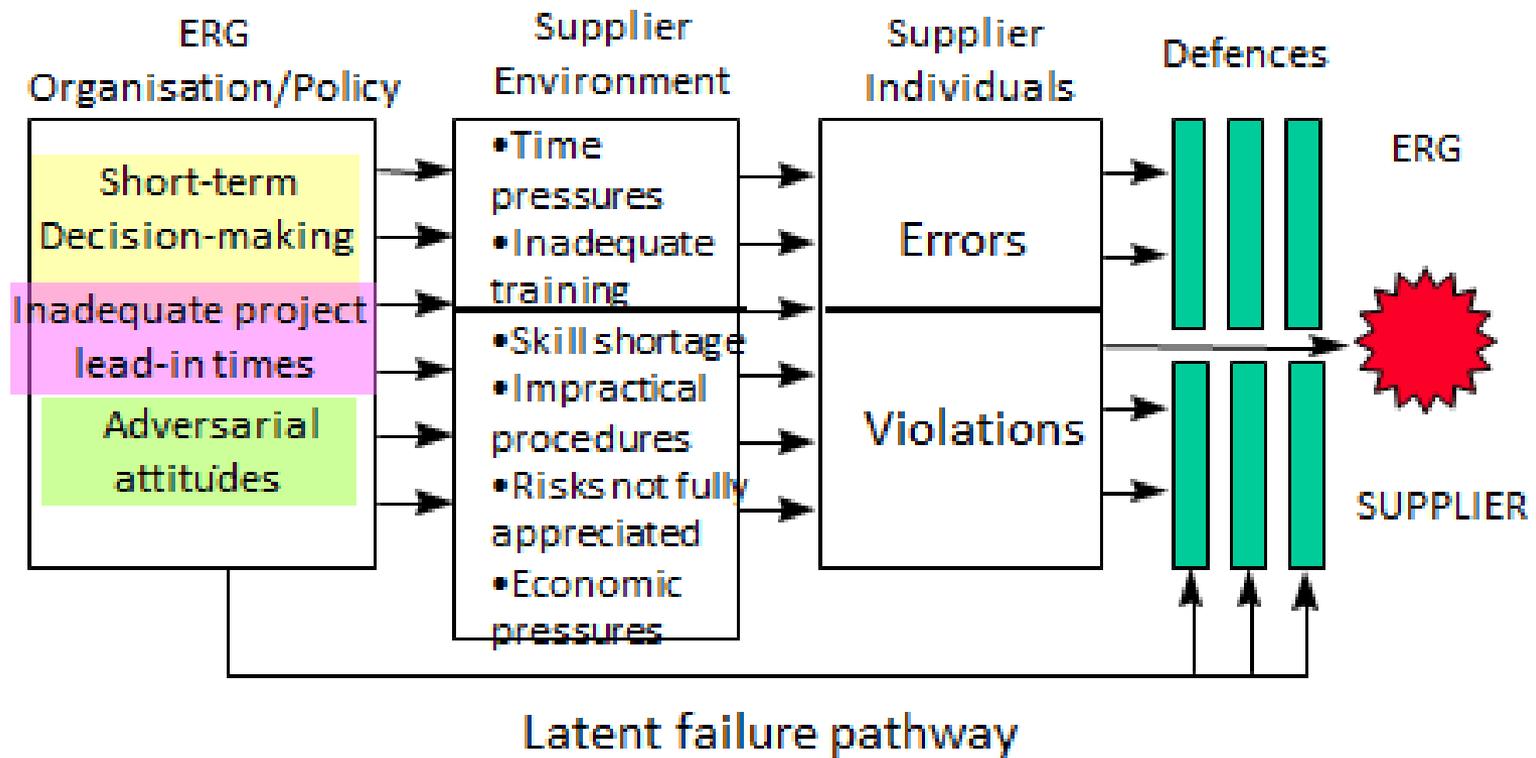
Asset Management

How organisational factors affect maintenance errors

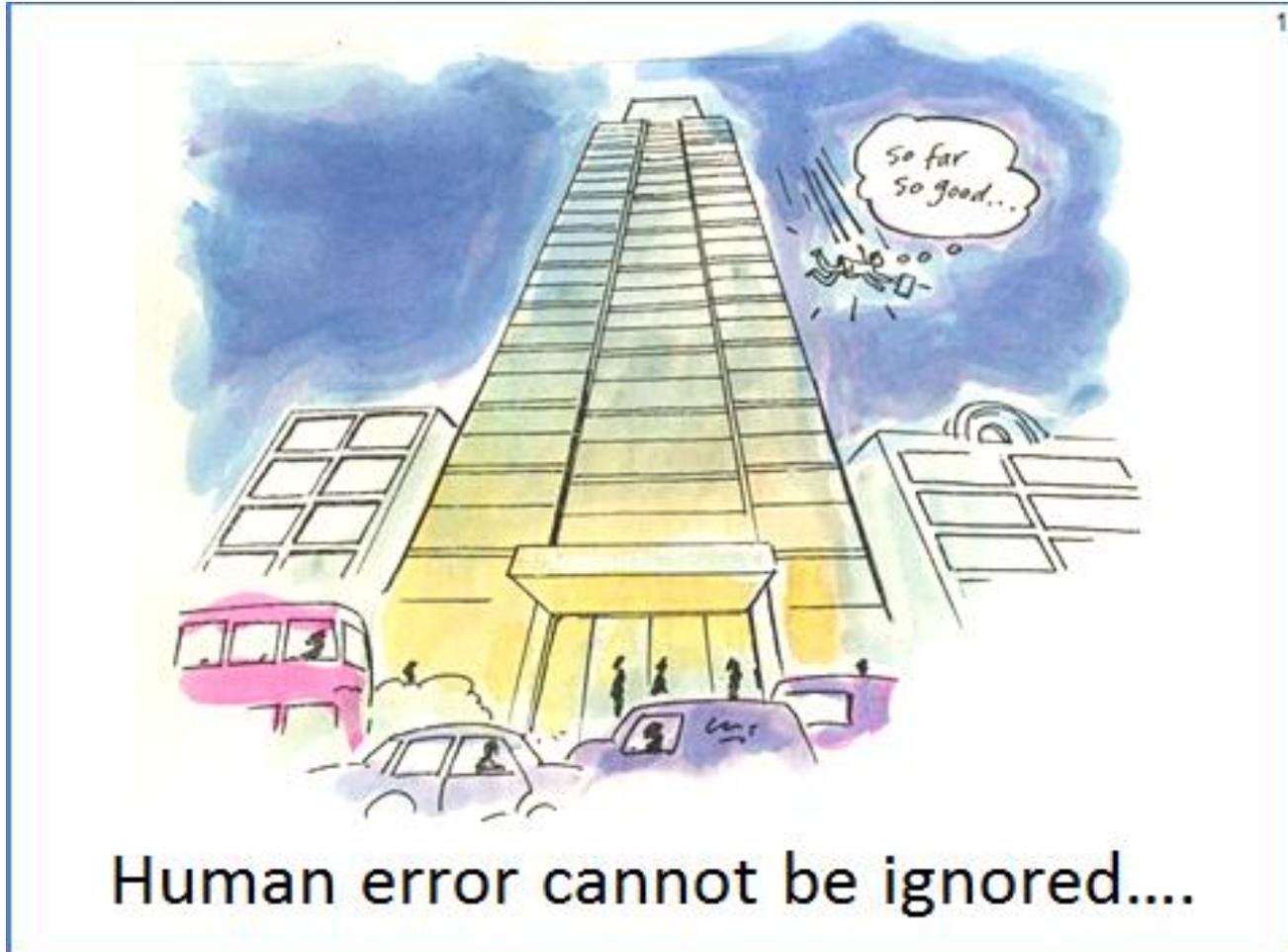


Asset Management

How organisational factors affect maintenance errors in practice



Asset Management



Asset Management

- Sandy wheelset
- 365 VCB
- Mk4 coupling nut

Sandy



Sandy



CI365 VCB



Mk 4 Coupling nut



Errors and Violations within the Supply Chain

Why did they happen?

- Time/ penalty pressure?
- Can do attitude?
- Insufficient knowledge?

Lack of process to deal with things when dealing with the non routine.

Errors and Violations within the Supply Chain

- Shorter franchises risk creating inappropriate behaviours
- Greater up front preparation with contractors mitigates risk
- Less adversarial contracting creates greater chance of success

Interoperability of EMUs

- Currently pre 1994 built DMUs excluding the cl165 and cl166 fleets are interoperable and this also includes the cl170 fleet.
- Currently all pre 1994 built AC EMUs excluding cl323 are also interoperable or were!
- Since 1994 no EMUs are interoperable with each other, sometimes even within classes.

Interoperability of EMUs

This is not an issue at present with limited electrification

- All new fleets are still operating on their original services.

In the future this is likely to be an issue with further electrification.

- It will be too costly for the industry not to.

Interoperability of EMUs

- It is not possible at present
- However with fly by wire technology it becomes feasible.
- Standard/ defined unit interfaces
- Main issue is PIS
- Reduce costs to industry and provide greater reliability for services

Appeal for assistance

- Shortage of Graduate trained Engineers due to demographics, especially rolling stock engineers
- Still a perception of Railway engineers as an 'oily rag brigade'
- However railways are becoming a solution rather than the problem
- Growth of between 2.5 and 3% is predicted

Appeal for assistance

- Currently the I Mech E young members visit 6-7 universities per year
- My aim is to engage with all 30 RRUK universities
- Some of the other institutions are willing to assist
- NSARE is willing to be the coordinating organisation

Appeal for assistance

- For further information please contact
- Richard Denham 07554 113518
- Chair of I Mech E Young Members

Advertisement

Next year's Annual technical visit will be



May 4th -9th 2014







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WINNING PAPER ENTITLED:

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