Decision making over the asset lifecycle

An infrastructure manager’s perspective

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Background

Significant progress in railway asset management over past ten years but:

- We have a tendency to seek simple solutions to complex problems
- We make the problem fit the solution rather than the solution fit the problem
- We optimise solutions within a narrow envelope
- We create a false sense of precision in our forecasts and plans which invariably turn out to be wrong

There is a good metaphor for highly simplified models of complex real life phenomena (see episode of Big Bang Theory, 2012)
What we need to do as infrastructure managers

Challenges
- Real world problems
- Complex causes

Barriers
- Siloed decisions
- Time

Solution
- Whole system
- Aligned incentives
Step 1

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Real world problem: fixing punctuality in NR

What is the cause of the drop in punctuality?
- Increase in traffic density?
- Time to correct failures?
- Sub-optimal timetable?
- Availability of train crew?
- Misaligned incentives?
- Industry structure?
Step 2

Challenges
- Real world problems
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Barriers
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- Whole system
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Railways: the birthplace of the modern organisation (and the business silo)

- Need to look back more than 150 years
- Railways became too expensive, big and complex for traditional ownership model. Required:
  - Separation of ownership and management
  - Organisational hierarchies
  - Spans of control
  - Geographical areas
  - Grouping of professions
- New model so successful that by end of 19th Century it was adopted by every large business sector (banking, insurance, manufacturing, chain stores...)

GREAT EVENT
Rail Road from the Atlantic to the Pacific
GRAND OPENING
Union Pacific
Rail Road
Platte Valley Route.

May 10th, 1869
1869.
Our forebearers have left us with four key types of silo

- **Functional silos**
  - Strategy, planning, delivery

- **Asset silos**
  - Track, signalling, bridges etc.

- **Intervention silos**
  - Maintenance, renewal, enhancement

- **Service silos**
  - Capacity, punctuality, safety etc.

**Silo Definition**:

A system, process, department, etc. that operates in isolation from others.

Ref. English Oxford Dictionary
Result: Complex web of decisions
How silos inhibit good decisions

Difficult to move funding between asset disciplines

The trade-off between maintenance and renewal is more concept than reality

Sub-optimal possession strategies due to misaligned incentives between train operators and infrastructure manager

Adoption of new technologies is slowed down due to complexity of interactions between stakeholders
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Solution
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Breaking down the silos

► Connect the functional silos
  ► Focus on defining the interfaces

► Connect the asset silos
  ► Integrated data, single point of access.

► Connect the intervention silos
  ► Remove capex/opex distinction

► Connect the service silos
  ► Use common currency
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Objective is to minimise the total cost, not the individual components.
Putting it together: a joined-up view of the future

Transpennine route
- Connects Manchester, Leeds, York
- Major upgrade underway
- Chart provides baseline cost and performance forecast before enhancements
- Enables improvement options to be assessed on whole life, whole system basis

Average annual cost per km over next 50 years
Conclusions

Progress in asset management through standards and processes has provided a good foundation for improved decision making.

Reaching the next of asset management maturity requires us to:

- Acknowledge the complexity of real world problems
- Create effective interfaces between organisational silos
- Adopt a whole life, whole system approach - not just talk about it
- Embrace uncertainty in decision making – it’s not going to go away
Related presentations

- IN2SMART S2R Project: First results towards an Intelligent Innovative Asset Management System
  - Carlo Crovetto, Ansaldo STS (session 7A)

- Bridging the gap between operations and long-term asset investment: a simulation case applied to Network Rail’s asset portfolio
  - Witold Krasny, Cosmo Tech (session 7B)
Thank you for your attention