Future Infrastructure Forum - 3

Asset management group

Cambridge: 17,18 April 2012

Asset management group

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Asset Management group

FIF-2 : 17,18 January 2012

- first break-out session

- second break-out session

- summary as presented

FIF-3 : 16,17 April 2012

- slides prepared between FIF-2 and FIF-3

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Summary as presented

- We propose a National Asset Management strategy to provide a process enabling evidence based decision making, so we will know what to spend, where, and when, to avoid surprises.

- This will enable a holistic view across all assets, so decisions can be taken with a full understanding of consequences across all assets.

- We are dealing with active, ageing, and complex networks managed in a diligent, best endeavour, but often on a single asset or local basis.

- We face the external drivers of growing demand, climate change and economic and financial crises.

- The need is to spend "more cleverly", to obtain the performance needed without unacceptable surprises or consequences.
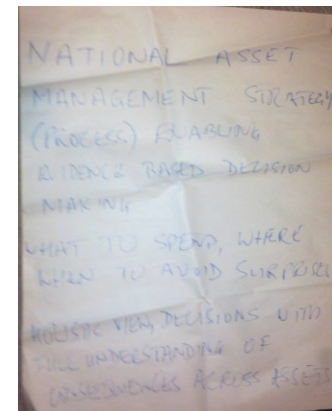
Scope and benefits

- Scope – asset-based businesses (cf facilities management)

- Engineering leadership of research into long-term "management"

- Step change needed, vs tends to be incremental

- Success = safe, reliable, reasonable costs

- Less network disruption = less costs

- Sustainability : ? pay more to reduce CO_2

- To demonstrate extent to which ageing / deteriorating

- Financial framework for notional depreciation

- Improved understanding across systems

  - Integrated criteria

  - Appropriate risk of failure

  - Improved performance of assets
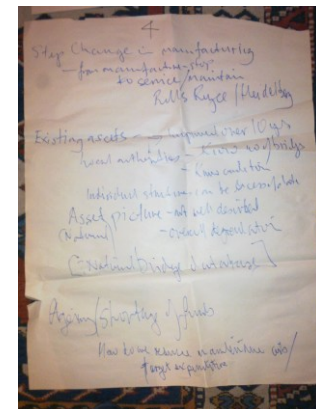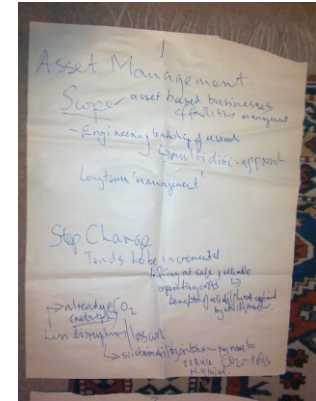
Prioritisation and performance

- Prioritisation
    - Consequences of failure
    - Interdependency brings complexity
        - ? tool used by HA – reliability – governance
    - How do we know what needs spending when ?
- Regulated / non-regulated
    - affects investment cycle / cost of service
- Regulator criteria for performance
    - Water leakage - not catastrophic
    - Rail – reliability of service – failure of system
- Quantification of uncertainty
- Preparedness for national / man-made disaster across (all) systems

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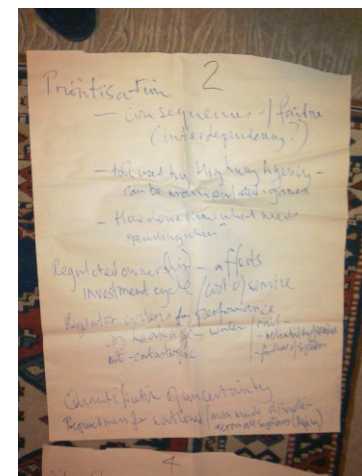
Problem and opportunity

- Ageing structures and a shortage of funds

  - How do we reduce (maintenance) costs and target expenditure most effectively ?

- Existing assets – data has improved

  - local authorities know number of bridges and condition

  - Individual structures - can be excess of data

  - national asset picture – not well described, overall deregulation (? national bridge database)

- Step change in infrastructure creation

  - from "*manufacture-stop*"

  - to "*service-maintain*" (eg Rolls Royce)
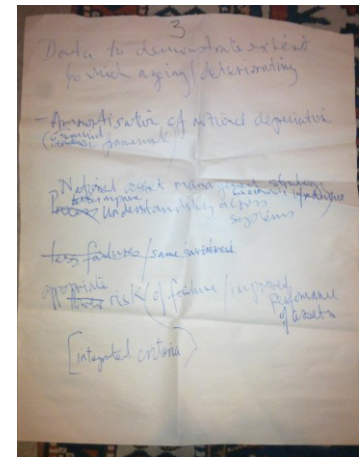
What would it look like ?

- Enrichment of (NIP) performance metrics

- Refresh/challenge Greenbook approach

  - enabler or barrier to asset management ?

  - biased to demand expansion ?
    not robust asset performance

- Aid to government or asset owner

- Avoiding surprises

- Informing higher levels of decision-making

- Integrated view of state of assets
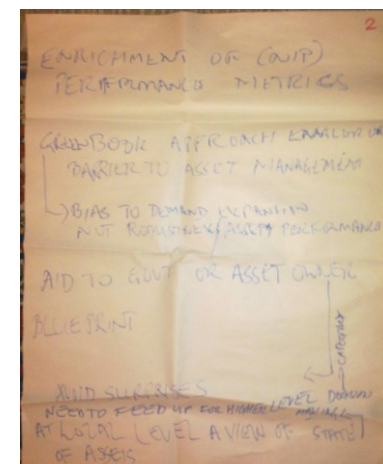
Data and information

- Collect data (recognise data heirachy)

  - Non-commensurate

- National Statistics Office for infrastructure

  - Useful national information from individual asset owners

  - Benchmarking of

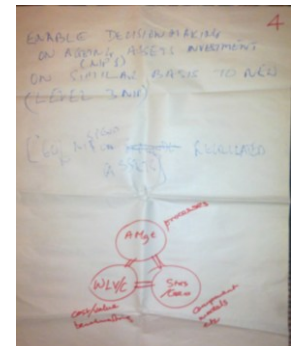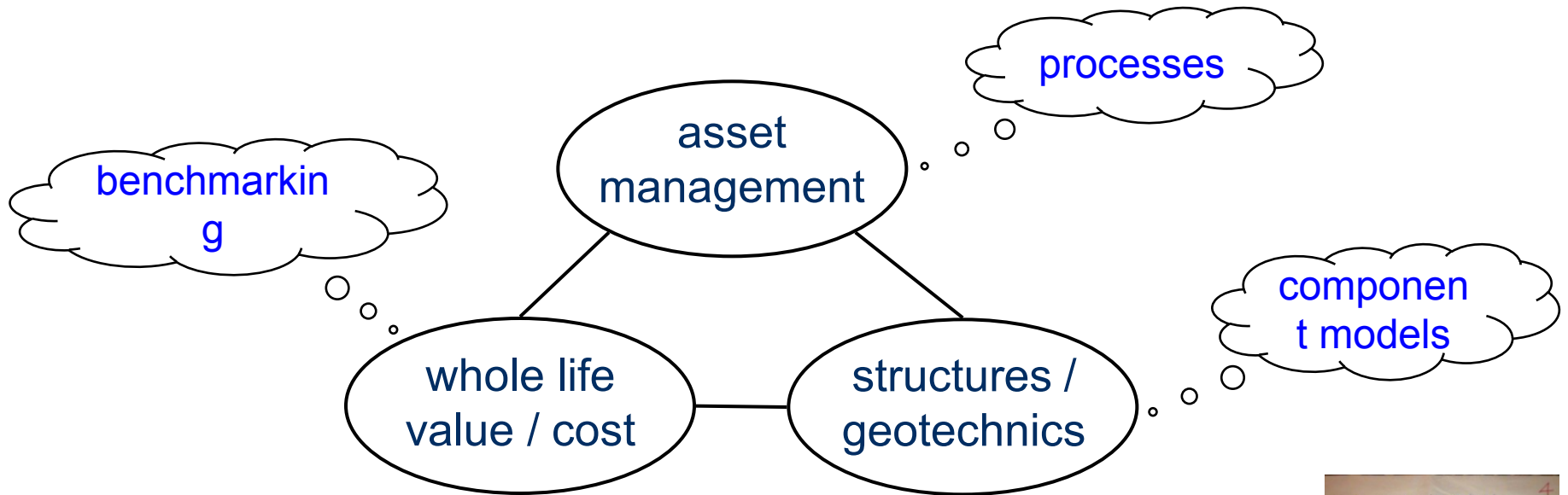   - performance

    - operating costs

    - deterioration

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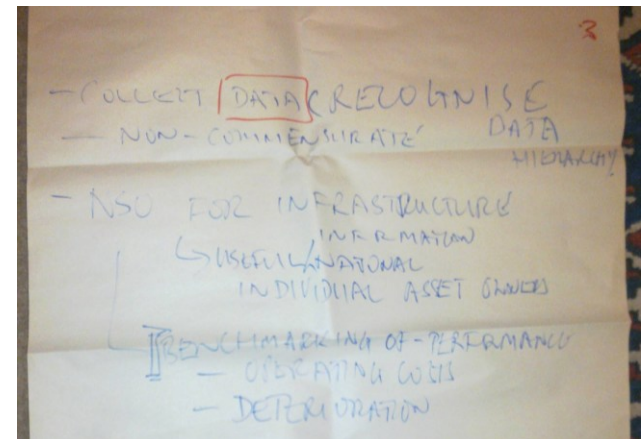
Vision

- By 5 years' time, the 2017 NIP should be able to report on the *NAMSEI (National Asset Management Strategy for Economic Infrastructure)*

- Not just decisions on single assets

- A strategy for data collection and decision-making across assets
  - Appropriate performance
  - Addressing all risks
  - Evidence based
  - Metrics for existing assets

- Consistent investment decisions on
  - ageing assets
  - new assets
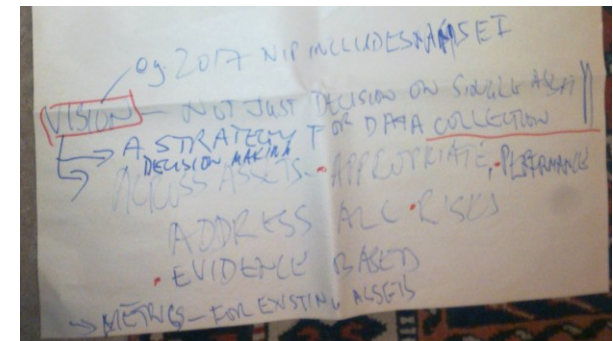
Possible integrated proposal structure

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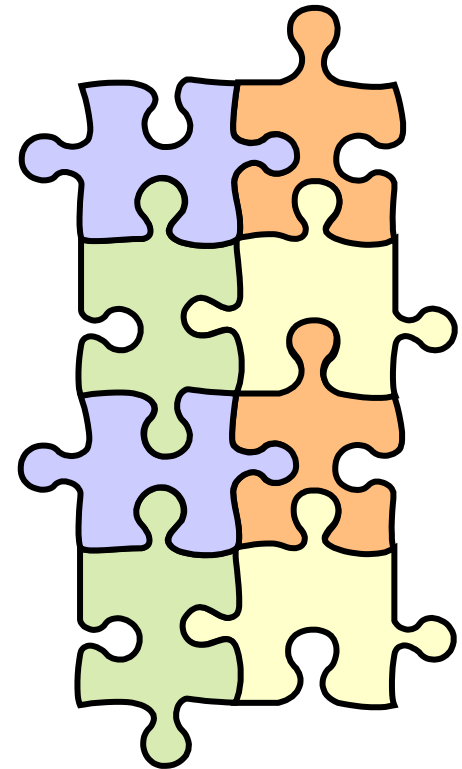
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Putting it all together

- Assets

- Performance

- Deterioration

- Failure

- Observation

- Intervention

- Prioritisation

- Wider implications

(... and information, processes and people)

Assets, performance, deterioration and failure

- What and where is the asset ?

- What are its purpose and performance requirements ?

- What is its service environment ?

- What is its expected lifecycle ?

- What are its potential forms and distribution of deterioration ?

- How does deterioration lead to failure ?

- Which are its critical / vulnerable sub-assets ?

- How does sub-asset failure affect asset performance ?

- How are the performance requirements increasing ?

- When do we expect increasing performance requirement to meet capacity decreasing due to deterioration / sub-asset failure ?

- What are the potential consequences of failure ?
  (e.g. direct cost, indirect cost, penalties, opportunity cost / loss of availability, safety, environmental, reputational)
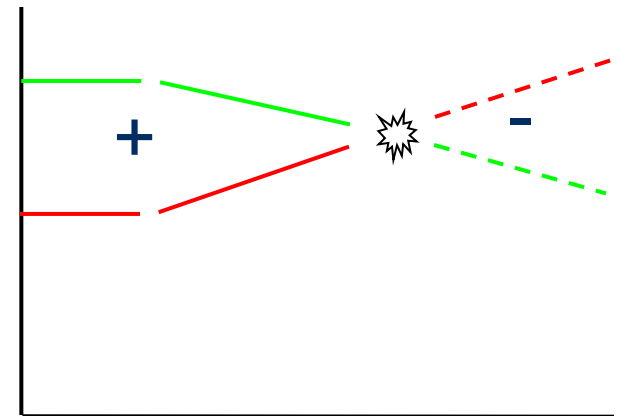
Observation and intervention

- Are deterioration symptoms visible or is another form of observation required ?

- Do we have sensors able to monitor the deterioration mechanism ?

- Will monitoring the critical / vulnerable sub-assets give us useful warning or will failure be sudden ?

- What are the potential intervention principles ?
  e.g. restrict demand / maintain / repair / partial replacement / full replacement

- What are the attributes of the interventions ?
  e.g. cost / other impacts / trigger / improvement / own deterioration rate

- Can we rank the sub-assets and potential interventions ?
  e.g. by timing, likelihood, consequences (doing / not doing)

- How does the total cost /yr of the proposed interventions compare with the available budget ?

- How will the likelihood and consequences of failure increase with delay ?
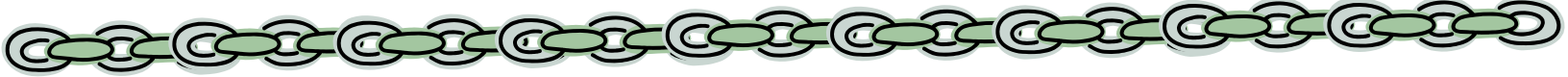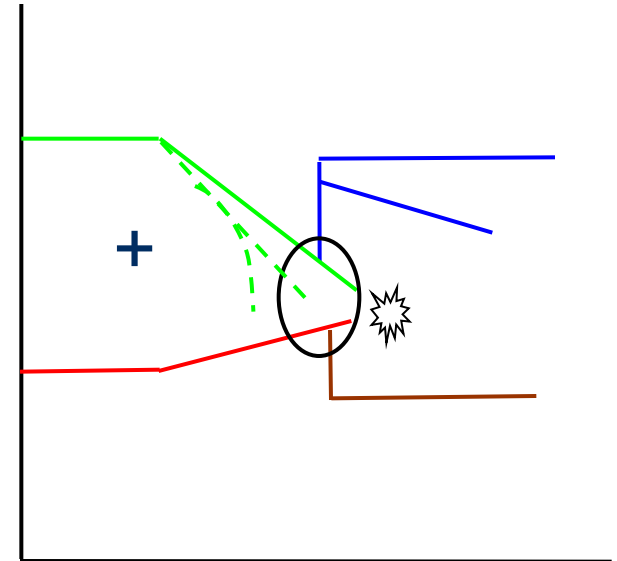
Prioritisation and wider implications

- Will future combinations of in-year and delayed work be feasible and affordable, or will we be creating a growing back-log ?

- Would it be better overall to intervene earlier (e.g. before visible symptoms) if this helped reduce the future back-log ?

- Can we afford the spend rate needed to complete an overall intervention cycle across our asset base, within the length of that intervention cycle ? (e.g. are we *"painting the Forth Bridge"* fast enough to be finished before the next re-paint is needed ?)

- Would an "asset-as-a-service" model be feasible ? helpful ? (e.g. aircraft engines / DBFO roads)

- How could we articulate the potential wider impacts of the infrastructure back-log compared to other non-infrastructure calls on budget ?
  - Across asset hierarchy ?
  - Across asset types ?
  - Across networks and systems ?
  - Across funding streams ?
  - Across Government Departments ?

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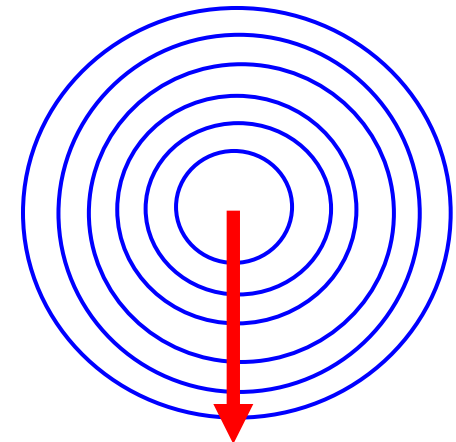
1. What and where is the asset ?
2. What are its purpose and performance requirements ?
3. What is its service environment ?
4. What is its expected lifecycle ?
5. What are its potential forms and distribution of deterioration ?
6. How does deterioration lead to failure ?
7. Which are its critical / vulnerable sub-assets ?
8. How does sub-asset failure affect asset performance and what are the consequences ?
9. How are the performance requirements increasing ?
10. When do we expect increasing performance requirement to meet capacity decreasing due to deterioration / sub-asset failure ?
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18. How does the total cost /yr of the proposed interventions compare with the available budget ?
19. How will the likelihood and consequences of failure increase with delay ?
20. Will future combinations of in-year and delayed work be feasible and affordable, or will we be creating a growing back-log ?
21. Can we articulate the potential wider impacts of the infrastructure back-log compared to other non-infrastructure calls on budget ?
22. Would it be better overall to intervene earlier (e.g. before visible symptoms) if this helped reduce the future back-log ?
23. Can we afford the spend rate needed to complete an overall intervention cycle across out asset base, within the length of that intervention cycle ? (e.g. are we painting the Forth Bridge fast enough to be finished before the next re-paint is needed ?)
24. Would an "asset-as-a-service" model be feasible ? (e.g. aircraft engines or perhaps a DBFO road)

Thank you

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