Case Studies in State of Good Repair

Defining and Measuring SGR

March 25, 2009
Agenda
Agenda

- State of Good Repair and PPPs
  - National Reinvestment Needs
  - How can PPPs Help?
  - Implementation Challenges:
    - Infrastructure Management
  - London Underground Experience
National Reinvestment Needs
Perspective: SGR Reinvestment Needs

- An estimated $80 billion is required to bring US transit assets to a state of good repair or “SGR”
  - Once attained, an additional $12.1 billion in “normal replacement” would be required annually to maintain SGR
- Alternatively, $16.1 billion would be required annually over the next 20 years to address both SGR and normal replacement needs
- In contrast, the current annual reinvestment rate is roughly $9.3 billion
- The backlog is projected to increase
Perspective: SGR Reinvestment Needs (cont)

- Roughly $61 billion of the $80 billion SGR backlog is for rail related reinvestment needs
- Rail reinvestment needs are highest for:
  - Guideway Elements (track and structures)
  - Systems (train control, electrification, comms, fare collection)
  - Stations
- Over $50 billion of SGR needs are for the nation’s largest and oldest rail systems
Potential Roles for PPPs
How Can PPPs Help Address SGR Needs?

- Local agencies lack the capacity to fully address the SGR backlog
- PPP’s provide the potential to help:
  - “Do more with less”
  - Facilitate financing
  - Accelerate reinvestment
  - Increased accountability for performance
  - Improve responsiveness to deficiencies
How Can PPPs Help Address SGR Needs?

**Approaches to SGR**

- **Major Projects**
  - **Focus:** One-off, large scale reinvestment projects

- **Infrastructure Management**
  - **Focus:** Ongoing asset maintenance, rehab and replacement (30 plus years)

**PPP Models**

- **Project Delivery Methods**
  - Design-Build-Operate-Maintain
  - Design-Build-Finance-Operate
  - Build-Operate-Transfer

- **Long-Term Concession / Lease**
  - “Infraco” responsibilities:
    - Assets and Operations
    - Assets only
    - Limited assets

Remainder of this Presentation Focuses on Issues Relating to SGR and Infrastructure Management
SGR and Infrastructure Management: Challenges
SGR and Infrastructure Management: Challenges

- Development of US Infrastructure management agreements face several key challenges:
  - Good asset data
  - State of Good repair measurement
  - Life cycle definitions / requirements
  - Valuing risks and penalties
Good Asset Data

Prior to entering an agreement, private partners will require reliable and comprehensive asset data.

**Asset Inventory Data**

- What does the agency own?
- What condition is it in?
- What is the remaining service life?
- Are there plans to expand?

*Without good asset data, private partners cannot accurately assess costs, risks, or returns.*
Good Asset Data (cont)

- **Challenge:** Few transit agencies currently maintain comprehensive asset inventories for capital planning purposes
  - For most that do, inventory data collection is a new practice
  - There are no standards for data content or level of detail
- In contrast, most US highway operators have maintained comprehensive pavement and bridge inventory and condition data for well over a decade

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Fixed Asset Ledger</th>
<th>Capital Asset Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Calculating depreciation for accounting purposes</td>
<td>Capital planning and asset management</td>
</tr>
<tr>
<td><strong>Typical Records</strong></td>
<td>Purchase contracts, past projects</td>
<td>Pieces of equipment to be maintained and replaced</td>
</tr>
<tr>
<td><strong>Records aggregated by:</strong></td>
<td>Date purchased</td>
<td>Asset type, useful life, and date purchased</td>
</tr>
<tr>
<td><strong>Basis for Useful Life</strong></td>
<td>Accounting schedules</td>
<td>Engineering assessments</td>
</tr>
<tr>
<td>Appropriate for Estimating Long-Term SGR Needs?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
SGR Measurement

– Similarly, public partners will want assurances assets are maintained and returned in an acceptable condition

– How should SGR be measured?

  • Condition rating based?
  • Percent exceeding useful life?
  • Performance based?
    ▪ Mean time between failures
    ▪ Delay time
    ▪ Availability for service
    ▪ Customer surveys

Without reliable measures, owners cannot be assured assets are well maintained or will be returned in satisfactory condition
SGR Measurement (cont)

- **Challenge:** There are few commonly accepted or commonly applied measures of SGR in US transit – industry moving slowly in this direction

### Condition of US Rail Assets

- Excellent: 8%
- Good: 22%
- Adequate: 35%
- Marginal: 27%
- Poor: 8%

Source: TERM 2008

### Percent of US Rail Transit Assets Exceeding Their Useful Life

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>TERM Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guideway Elements</td>
<td>5%</td>
</tr>
<tr>
<td>Structures</td>
<td>5%</td>
</tr>
<tr>
<td>Trackwork</td>
<td>5%-10%</td>
</tr>
<tr>
<td>Facilities</td>
<td>20%</td>
</tr>
<tr>
<td>Bus</td>
<td>20%</td>
</tr>
<tr>
<td>Rail (Yards &amp; Shops)</td>
<td>15%</td>
</tr>
<tr>
<td>Systems</td>
<td></td>
</tr>
<tr>
<td>Signals</td>
<td>30%</td>
</tr>
<tr>
<td>Power</td>
<td>5%</td>
</tr>
<tr>
<td>Communications</td>
<td>20%</td>
</tr>
<tr>
<td>Elevators / Escalators</td>
<td>15%</td>
</tr>
<tr>
<td>Stations</td>
<td>20%</td>
</tr>
<tr>
<td>Revenue Vehicles</td>
<td>25%</td>
</tr>
</tbody>
</table>
Life Cycle Reinvestment Requirements

- Public entity may require asset life-cycle reinvestment requirements are well specified
- Including the timing and extent of:
  - Preventive maintenance
  - Rebuilds / rehabs
  - Replacements
- **Challenge:** There are few life cycle “industry standards” for transit
  - Diverse asset types
  - Needs vary by agency, context, make and manufacturer
Performance Measures

- Alternative (or complement) to direct SGR measures or specific life cycle needs
- Provides indirect measure of asset condition based on:
  - Failure Rates
  - Passenger delays
  - Availability
  - Service Quality
Case Study: London Underground
London Underground Suffered from a History of Chronic Under-Investment

To address this issue, in 2003 LU was broken into four parts under a PPP – including three private sector “infracos” and a public sector operating company (LU)

- Thirty year PPP agreement
- LU operates the rail service
- Infracos responsible for physical assets - including trains, tracks, tunnels, signals and stations
- Each infraco responsible for a set of rail lines (agreements based on line / location, not asset type)
- Infracos responsible for raising funds for SGR investments
- The timing of vehicle deliveries, station refurbishments and many other reinvestments written into PPP contract
SGR and Asset Management Under the LU PPP

— The PPP imposes a number of requirements on the Infracos:

- **Whole life cost approach** Infracos must optimize asset performance over the life of the asset, not the life of the contract
  - Ensures assets are returned in good condition at the end of the contract
- **Overall good condition** Infracos explicitly required to restore and manage assets to an overall state of good condition
  - Must demonstrate progressive improvement in asset health
- **Asset knowledge** Infracos required to improve understanding of the link between asset condition and performance
- **Safety and service loss** In managing the assets, Infracos must minimize service loss risks and safety risks.
SGR Related Performance Measurement

- Asset conditions are measured / monitored indirectly based on a range of performance measures (by location and asset type):
  - Number of failures
  - Mean time/distance between failures
  - Lost customer hours (due to failures)
  - Line capability (travel time between points in minutes)
  - Ambience of customer facing assets (based on customer surveys)

- Actual performance measures are evaluated relative to benchmarks and contractual bid-templates

- Financial penalties for poor performance
Outcomes

– One of the London Underground “Infracos” went into receivership and cost the UK government a reported $4 billion

– Outcome result of:
  • Weak asset management practices
  • Limited application of risk based approaches to assessing and prioritizing reinvestment needs

London Underground PPP: Were they good deals?

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
Questions?

Study Contact Information:

Rick Laver
Senior Consulting Manager
AECOM Consult
3101 Wilson Boulevard, Suite 400
Arlington, VA 22201
direct: 703.682.5032
cell: 703.638.3081
richard.laver@aecom.com