Topics:

1. Capital Planning and Programming at the MBTA\(^1\)
   - Background
   - SGR Database Model
   - Capital Planning Analysis
   - MBTA Use of SGR

\(^1\) Based on work by Steve Barrang, Director, MBTA Department of Capital Management, and Brian McCollom, McCollom Management
Concentrated Service Expansion

Increases in
Rail Route Miles,
Rail Ridership
Vehicle Miles
Service and Capital Spending Trends

Revenue Vehicle Miles

Straight Line Capital Trend

Total Capital Expenditures

millions of dollars ($1999)
The MBTA Capital Problem

- System has *expanded*
- Ongoing Capital Needs are *greater*
  -- system renewal
  -- system expansion
- Spending on Ongoing Capital Needs is *decreasing*
MBTA Approach

• MBTA focus is first on developing State of Good Repair (SGR) Database

• Two Project Objectives
  
  • Legislative: Demonstrate Ongoing Funding Needs
    -- Engineering assessment of current assets
  
  • Management: Develop long range capital planning model
    -- Project programming under constrained funding
State of Good Repair

SGR: The ideal operating condition
  • A “perfect” capital replacement policy
What is SGR?

• **State-of-Good Repair** — Replace/Renew when needed

• **Assets are:**
  
  – Renewed at critical midlife points
    • e.g., Engine replacements, bridge re-deckings, roof replacements
  
  – Replaced at the end of their useful lives
    • e.g., Buses 15 years
      Rail cars 35 years
      Bridges 50 years
SGR Database (Model) Requirements

• Focus on high-cost MBTA assets
  – Not a maintenance database of all assets

• Permit periodic data updates
  – Staff and resources limited

• Support objective analysis
  – Uniform criteria and process
  – Reports consequences

• Run scenarios in reasonable time frame
  – Less than 5 minutes
SGR Database — Assets Table

- Stores information about all key MBTA assets
  - Vehicles
  - Facilities
  - Systems
Asset Table Attributes

- "Condition" Measures
  - Age
  - Life

- Project "Action" Costs
  - Replacement/Renewal
  - Cash flow years

- Ranking Measures
  - Condition measures
  - Operational importance
  - Affected ridership
Scoring Candidate Actions

- **Age**
  - Age as % of Service Life

- **Operational Impact**
  - Yes/No
  - Selected assets are essential to system operations

- **Cost-Effectiveness**
  - Ridership/Cost of Action
  - Reflects customer service impacts
SGR Programming Process is Sequential (Year-by-Year)

- Identify candidate projects
  - Actions come due
  - Delayed projects from prior years

- Score and rank projects

- Fund projects in rank order until:
  \[ \text{Cost (project } i \text{)} > \text{Funds remaining} \]

- Mark unfunded projects as candidates for next year

- Carryover remaining funds to next year
What are the system’s needs?

- Cost to bring and maintain existing assets to the “ideal” standards
  - Capital Renewals
  - Capital Replacements
Unconstrained Funding

• Baseline comparison for all scenarios
• Simulates effect of unlimited funds applied to capital needs
• Determines:
  – Minimum time and funds needed to achieve SGR
    • “Reduce the Backlog”
  – Funds required to maintain the system at SGR
Unconstrained Funding: Backlog

Seven years for procurements

At SGR after 2009
Unconstrained Funding: Backlog

Spending

Seven years for procurements

At SGR after 2009
Annual Funding: $350M
Current SGR Funding

[Graph showing annual funding from 2002 to 2022, with blue indicating $350M and yellow indicating unconstrained. The year 2004 is labeled with a text box indicating $350M.]
Annual Funding: $450M
Hold Backlog at Present Level

Year

$0 $200 $400 $600 $800

Unconstrained
$450M

Annual Funding: $570M

Eliminate Backlog in 20 years
Other Scenario Measures

• Beginning/Ending Period Comparisons
  – Backlog by Asset Type
  – Percent of Assets > Service Life by Asset Type

• 20-Year Totals
  – Spending by Asset Type
  – SGR Needs Funded On-time, Late, Not at All
MBTA Use of SGR Database

• Desired change in legislative capital funding

• Discussions with MBTA Board

• Potential use in the internal development of the Capital Improvement Program
Conclusion

• No transit system can meet the “ideal” system condition
  – We can make more effective decisions
  – We can optimize our investments