RISK-BASED ASSET MANAGEMENT
San Francisco Bay Area Rapid Transit (BART) District
WHY RISK MANAGEMENT?
COMMUTER/METRO SYSTEM

- BART operates the oldest heavy rail transit fleet in the U.S.
- In operation 41+ years
- 1st of its class built post-WWII
  - One-of-a-kind, hard to maintain
  - Tailored infrastructure, inflexible
  - Spurred economic development
  - Environmentally friendly
RAPID RIDERSHIP GROWTH

Average Weekday Ridership
Up nearly 100,000 trips since SFO Extension Opened

Average 6% ridership Growth over 2 years

01/28/2014
Today:
30.5% of BART assets are rated “Poor” and will cost $6.5 Billion to Fix

In 10 Years:
46% of BART assets will be rated “Poor” and will cost $9.7 Billion to Fix

The longer we wait...the higher the risk and expense
UC Berkeley / Bay Area Council study

If performance declines, what are the consequences for ridership and for the region?

Need to reinvest $500+ M / annually

Failure to reinvest - net regional economic loss:

$22 - 33 Billion
RISKS EVERYWHERE!

• Legacy
• Security
• Business
• Environment
• Demographic

• Technology
• Operations
• Economic
• Ridership
• Future

• Doing nothing is a risk (deterioration)
• Doing too much is a risk (complexity)
SYSTEMS ENGINEERING SUPPORTS STRATEGY

STRATEGIC OBJECTIVES

ASSET MANAGEMENT

RISK MGMT

PROJECT MGMT

SYSTEMS ENGINEERING

O&M

FINANCIALS

OTHER...

CHANGE MANAGEMENT

01/28/2014
LIFE CYCLE COSTS

$$\text{REAL LIFE}\quad \text{$$$$$$$$$$$}$$

SCOPE

QUALITY

BUDGET

SCHEDULE
WHAT ARE ‘AM’ AND ‘SGR’?

• Asset Management:
  – Maximize assets ability to generate value
  – Extend the economic life of assets
  – Minimize life cycle costs of assets

• State of Good Repair:
  – An asset is fit for its intended purpose and continues to provide value through its economic life
WHY ASSET MANAGEMENT?

• **Business imperative** – organizational sustainability

• **Federal Legislation** – statutory requirement:
  – Asset Management Plan
    - Inventory of assets
    - Condition of assets
    - Capital rehabilitation program
    - Decision support system
  – *Risk-based* decision making
  – Performance Measurements

• Regional **economic viability**
THE ASSET MANAGEMENT MODEL

Organisational Strategic Plan

Scope of Asset Management

Asset Management Strategy & Planning

Organisation & People Enablers

Asset Management Decision Making

Asset Knowledge Enablers

Lifecycle Delivery

Acquire
Operate
Maintain
Dispose

Risk & Review

Customers
Legislation
Investors
Commercial Environment

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HOLISTIC APPROACH

Integrate extent of investment needed to meet desired service levels while managing the risk to reliable service.
RISKS vs. COSTS

- Fiscal constraints lead to triage based on risk level
- Example shows how $41M investment can stave off a $243M crisis ... for a time
- Any funds in addition to $41M contribute to reducing the speed of infrastructure decay and backlog build up.
SYNCHRONIZING FRAMEWORKS

Source: PMBOK Guide, 5th-Ed., PMI
SYSTEMATIC APPROACH

One Approach to Managing the Installation of a Telecommunications Network

Initiating Processes → Planning Processes → Executing Processes → Closing Processes

Potential Approach to Building a Network

Design Phase
- Monitoring and Controlling Processes
- Initiating Processes → Planning Processes → Executing Processes → Closing Processes

Construction Phase
- Monitoring and Controlling Processes
- Planning Processes → Executing Processes → Closing Processes

Figure 2-10. Example of a Single-Phase Project

Figure 2-12. Example of a Project with Overlapping Phases

Monitoring & Controlling Processes

Planning Processes

Executing Processes

Closing Processes

Figure 3-1. Project Management Process Groups

Enter Phase / Start project → Initiating Processes → Closing Processes → Exit Phase / End project

Source: PMBOK Guide, 5th-Ed., PMI
RISK - SYSTEM PLANING

• Make allowances for technology evolution
• No single-points of failure
• Mind the "ilities" (keys to good LCC):
  • Maintainability
  • Reliability
  • Availability
  • Quality
  • Security
  • Workmanship

THE DEVIL ‘S IN THE DETAILS
KEYS TO SUCCESS

• Communication
• Executive Support
• Governance
  – Risk Management
  – Change Management
  – Program/Project Management

• Bottom-up and Top-down (voice of the infrastructure)
• Cross-disciplinary (silo busting)
WHY SYSTEMS ENGINEERING?
TAKEWAYS

• Asset Management is a:
  – Business imperative
  – Legislative requirement

• Risk-based AM maximizes scarce resources

• AM is an element of the SE ecosystem

• SE builds the foundation to a stable future

• SE is an essential element of success
Questions?

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