Asset Management
Risk 101

Where to start
Triage
Have you ever wondered why...

• How would you prioritize all transportation asset related investments across the country?
  • Where would you start?

“The objective of this performance and outcome-based program is for States to invest resources in projects that collectively will make progress toward the achievement of the national goals.” FTA MAP-21 Fact Sheet
Federal perspective

“MAP–21 fundamentally shifted the focus of Federal investment in transit to emphasize the need to maintain, rehabilitate, and replace existing transit investments.”

(Federal Register / Vol. 81, No. 143 / Tuesday, July 26, 2016 / Rules and Regulations, P. 48912)

“In these financially constrained times, transit agencies will need to be more strategic in the use of all available funds.”

(Federal Register / Vol. 81, No. 143 / Tuesday, July 26, 2016 / Rules and Regulations, P. 48946)
<table>
<thead>
<tr>
<th>Goal area</th>
<th>National goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>To achieve a significant reduction in traffic fatalities and serious injuries on all public roads</td>
</tr>
<tr>
<td>Infrastructure condition</td>
<td>To maintain the Highway infrastructure asset system in a state of good repair</td>
</tr>
<tr>
<td>Congestion reduction</td>
<td>To achieve a significant reduction in congestion on the National Highway System</td>
</tr>
<tr>
<td>System reliability</td>
<td>To improve the efficiency of the surface transportation system</td>
</tr>
<tr>
<td>Freight movement and economic vitality</td>
<td>To improve the national freight network, strengthen the ability of rural communities to access national and international markets, and support regional economic development</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>To enhance the performance of the transportation system while protecting and enhancing the natural environment</td>
</tr>
<tr>
<td>Reduced project delivery delays</td>
<td>To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies’ work practices</td>
</tr>
</tbody>
</table>
# MAP 21: FTA requirements for TAMP elements

<table>
<thead>
<tr>
<th>No.</th>
<th>TAMP Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asset inventory</td>
<td>All capital assets owned by agency, including equipment (construction, maintenance, service vehicles), rolling stock (rail cars, buses, ferries), infrastructure (fixed guideway, signal systems, structures, power), facilities (support, passenger, parking)</td>
</tr>
<tr>
<td>2</td>
<td>Condition assessment</td>
<td>A rating of the inventoried assets with direct capital responsibility (age, condition, percentage of residual life, vulnerability to natural/climate hazards etc). At the individual or asset class level.</td>
</tr>
<tr>
<td>3</td>
<td>Decision-making approach / support tools</td>
<td>List analytical processes used to make investment prioritization, does not have to be software tool</td>
</tr>
<tr>
<td>4</td>
<td>Investment prioritization</td>
<td>A financially constrained ranked listing of proposed projects ordered by year of planned implementation, prioritized based on local policy, needs, safety risks, etc</td>
</tr>
<tr>
<td>5</td>
<td>TAM and SGR Policy</td>
<td>The agency's vision for TAM, SMART objectives, roles and responsibilities</td>
</tr>
<tr>
<td>6</td>
<td>Implementation strategy</td>
<td>Operational level process for implementing TAM Plan</td>
</tr>
<tr>
<td>7</td>
<td>Roadmap activities</td>
<td>Description of actions needed to implement TAM Plan for each year of the plan's horizon</td>
</tr>
<tr>
<td>8</td>
<td>Needed resources</td>
<td>Staffing, technology, funding, etc</td>
</tr>
<tr>
<td>9</td>
<td>Evaluation plan for continuous improvement</td>
<td>How TAM activities will be monitored, evaluated, and updated to ensure the continuous improvement of TAM practices</td>
</tr>
</tbody>
</table>

Where is RTD with Risk Management?

- Using experience and best judgement
  - Triage
- We aren’t there yet
- Our plan:
  - Achieve minimum understanding and compliance with MAP-21
  - Take action
- Integrated SMS and Risk Management with TAM
Risk

• Probability and magnitude of a loss, disaster, or other undesirable event. - Hubbard

• Exposure to the chance of injury or loss; hazard or dangerous chance. – Dictionary. Com

• The hazard or chance of loss; Degree of probability of such loss – Insurance Institute

• The possibility that something unpleasant or unwelcome will happen – Oxford

• All these say - Something bad could happen
Probability $\times$ Consequence = Risk

<table>
<thead>
<tr>
<th>Probability</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Low Consequence</td>
<td>High Probability</td>
</tr>
<tr>
<td>Low probability</td>
<td>Low Consequence</td>
</tr>
<tr>
<td>High Probability</td>
<td>Low Consequences</td>
</tr>
</tbody>
</table>

Mitigation
Simplified Risk Management Process

Risk Assessment

- Identify Risks
- Analyze / Evaluate Risks
- Treat or Mitigate Risks

Monitor and Review

Communicate and Consult
Simplified Risk Management Process

1. **Identify Risks**
2. **Analyze / Evaluate Risks**
3. **Treat or Mitigate Risks**
4. **Monitor and Review**
5. **Communicate and Consult**

- **Risk Assessment**
Simplified Risk Management Process

- Service Risks
- Safety Risks
- Security Risks
- Cyber Risks
- Contractual Risks
- Financial Risks
- Funding Risks
- Human resources Risks
- Operation Risks
- Legal Risks
- Network Risk
- Asset Risk
- Competency Risk

- Reputational Risks
- Capacity Risks
- Credit Risk
- Insurance Risks
- Pension risk
- Operation Risks
- Capacity Risks
- Information Risk
- Weather Risks
- Competition Risks
- Unknown unknowns

Linkages between Risks
Simplified Risk Management Process

Event

Monitor and Review

Risk Assessment

Identify Risks

Analyze / Evaluate Risks

Treat or Mitigate Risks

Communicate and Consult
Simplified Risk Management Process

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- Communicate and Consult
Failure Mode Analysis

• FMEA: Failure Mode and Effects Analysis

• FTA: Fault Tree Analysis

• HAZID: Hazard Identification

• HAZOP: Hazard and operability Study
Simplified Risk Management Process

1. Identify Risks
2. Analyze / Evaluate Risks
3. Treat or Mitigate Risks
4. Monitor and Review
5. Communicate and Consult
Simplified Risk Management Process

Acceptance

Avoidance

Limiting

Transfer

Risk Assessment

Identify Risks

Analyze / Evaluate Risks

Treat or Mitigate Risks

Communicate and Consult

Monitor and Review
Simplified Risk Management Process

- Identify Risks
- Analyze / Evaluate Risks
- Treat or Mitigate Risks
Experience is inevitable. Learning is not. – Paul Schoemaker
Simplified Risk Management Process

1. Identify Risks
2. Analyze / Evaluate Risks
3. Treat or Mitigate Risks
4. Monitor and Review
5. Communicate and Consult

Risk Assessment
Simplified Risk Management Process

1. Risk Assessment
   - Identify Risks
   - Analyze / Evaluate Risks
   - Treat or Mitigate Risks

2. Communicate and Consult

3. Monitor and Review
Asset exist to deliver our agency goals

• Risks are anything that *may* prevent this.
• Why MAP-21 exists
  • Safety incidents / Age and Condition of infrastructure / Investments to reduce risks
• Common Risk language
• Risk management is understanding risks of different options
• Models must be back tested
• Develop a system to determine risk outside of subjective judgement
  • We aren’t good at this
• Risk are measurable and quantifiable
• All STARTS with good Asset Management practices
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