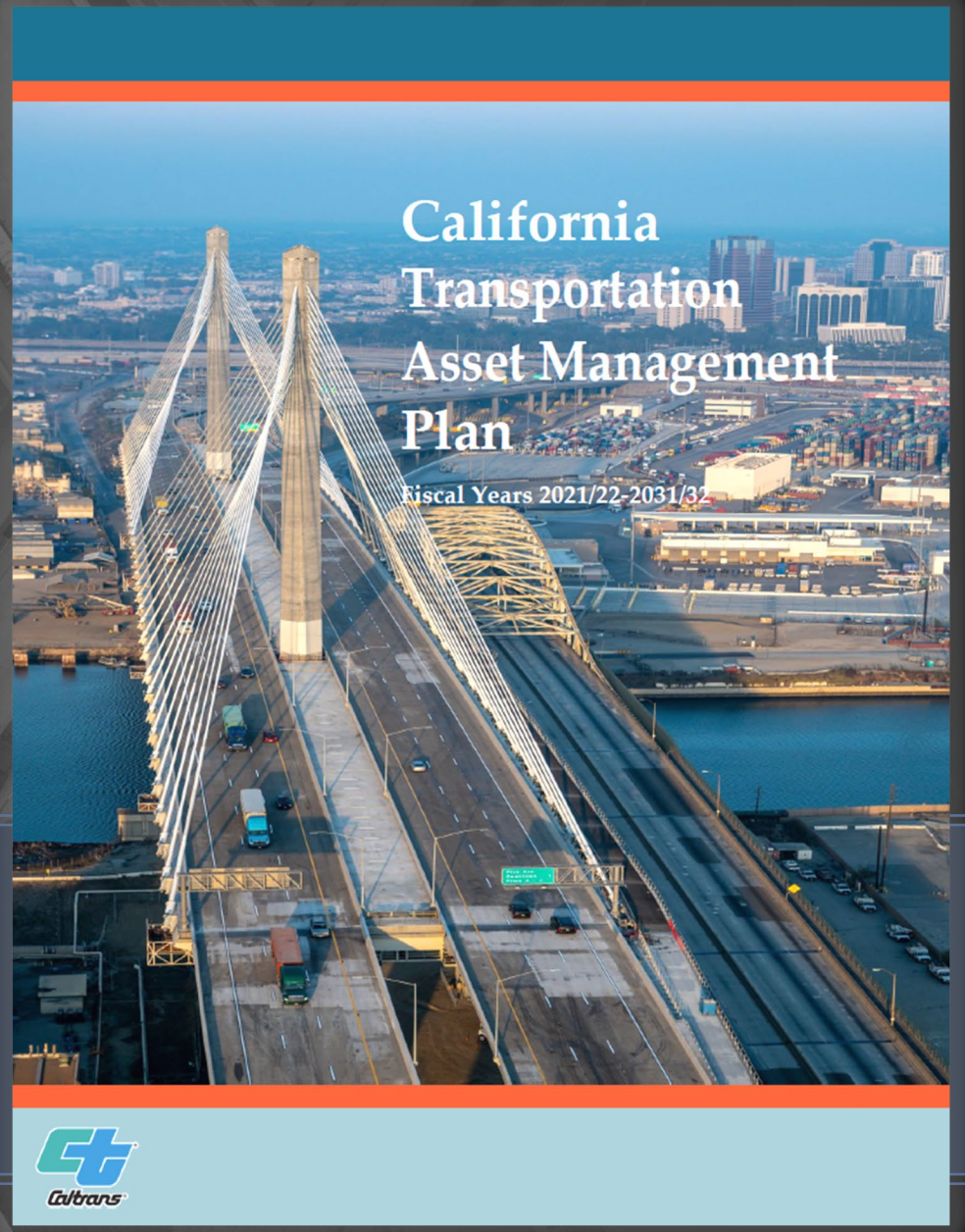


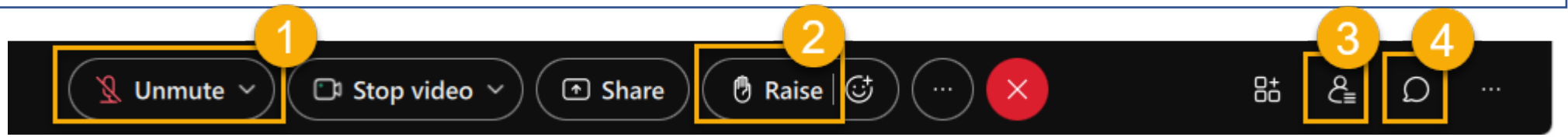
2026 California Transportation Asset Management Plan

Risk Management Workshop – Day 1

May 8, 2025

Webex Quick-Guide

- Function Bar



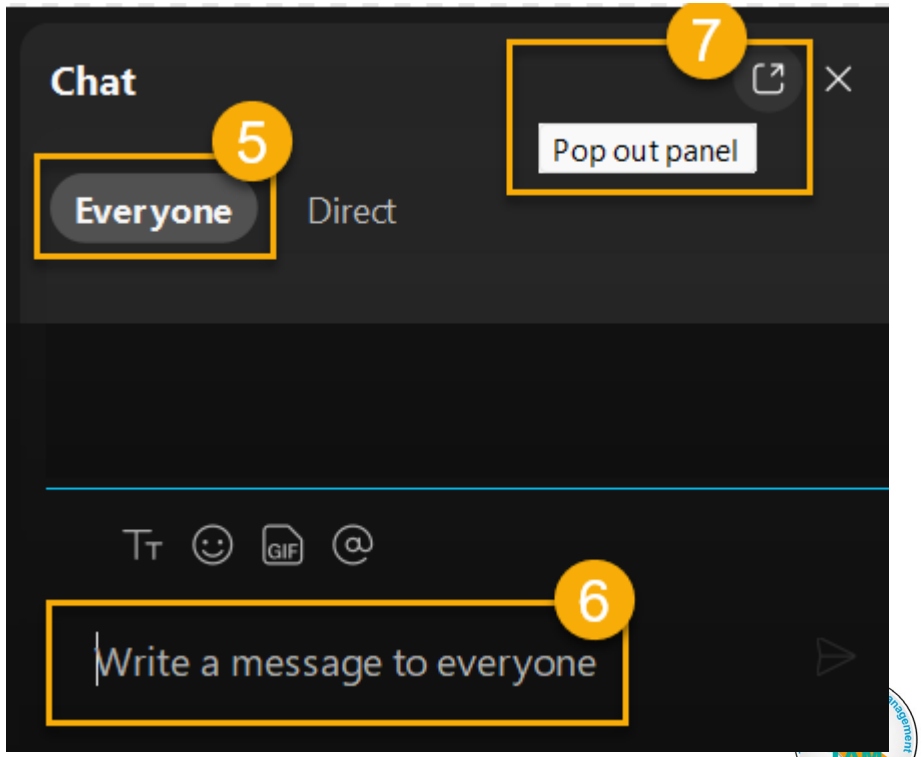
  1 = Audio Settings

  2 = Raise Hand

  3 = Participant Panel

  4 = Chat

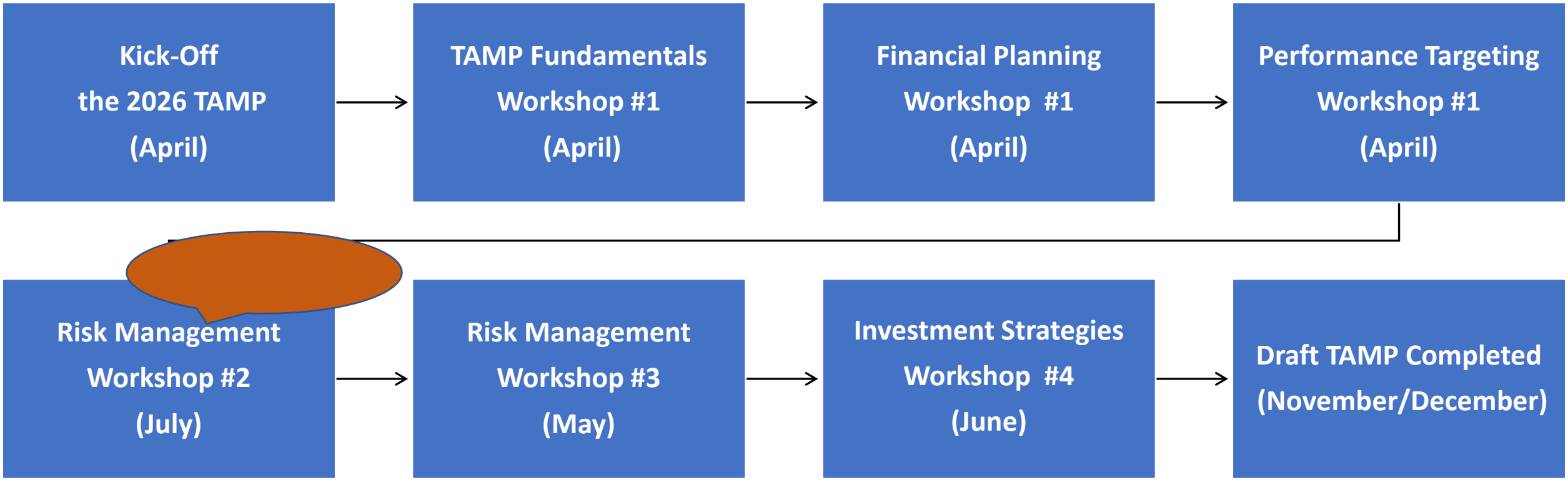
- Chat – Use Chat to Everyone (5 and 6)
- Pop out option for Chat Panel and Participant Panel (7)
- If you need technical assistance or have questions, please email: CT-TAM@dot.ca.gov



Agenda – Risk Management Workshop #1

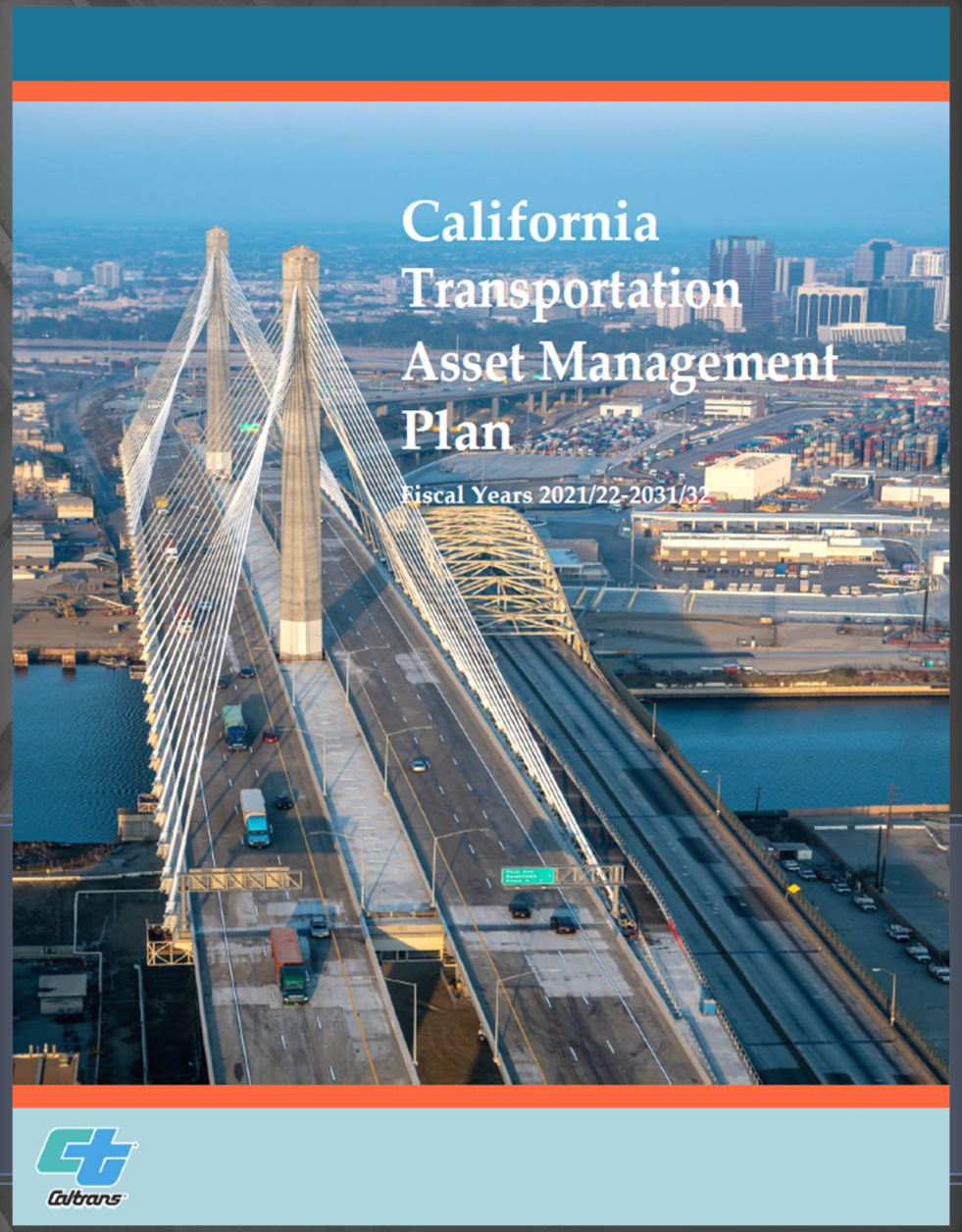
- Welcome & Overview
- Understanding TAMP Risk Management
- *Risk Identification & Assessment*
- *Risk Management through the 5 T's*
- Closing Remarks and Next Steps

2026 TAMP Workshop Series



Risk Management Overview

Michael B. Johnson
Statewide Asset Management Engineer
Caltrans, HQ Asset Management



Defining Risk Management

(in the context of transportation asset management)

Defining Risk Management
(in the context of transportation asset management)

RISK MANAGEMENT

Involves proactively anticipating and addressing potential issues to minimize their impact or capitalizing on opportunities to ensure organizational goals are achieved.

Components:

- Likelihood
- Consequence
- Mitigation Strategies
- Monitoring

Why Consider Risks in a TAMP?

- **The future is uncertain**
  - Wide variety of risks
  - Risks can be threats or opportunities
- **Public agencies are necessarily risk-averse**
  - Not simply trying to maximize performance
- **Considering risks leads to a more realistic TAMP**

Source: David Royal – Monterrey Herald

Source: REUTERS/ Kim Kyung-Hoon

Source: FHWA

Required Risk Management Process

1. Identification of risks that can affect condition of NHS pavements and bridges and the performance of the NHS
2. Assessment of the identified risks in terms of the likelihood of their occurrence and the consequence if they occur
3. Evaluation and prioritization of the identified risks
4. Mitigation plan for addressing the top priority risks
5. Approach for monitoring the top priority risks
6. Summary of the evaluations of facilities repeatedly damaged by emergency events

Example Risks from Federal Regulation
(23 CFR § 515.7)

- Risks associated with current and future environmental conditions, including but not limited to:
  - Extreme weather and climate change
  - Bridge seismic or scour
  - Geotechnical instability
  - Risk related to recurring damage based on separate analysis
- Financial risks such as budget uncertainty
- Operational risks such as asset failure

Additional Notes

Risk assessment should be considered in developing the TAMP investment strategies

The Caltrans Performance Targeting Analysis Tool (PTAT) can incorporate the impact of risk funding in the analysis

Risk Mitigation Strategies

- Treat (Mitigate):
  - take actions to reduce risk likelihood and/or consequence
- Tolerate (or Accept):
  - acknowledge risk but take no action
- Terminate (or Avoid):
  - eliminate the threat entirely
- Transfer (Ownership Change):
  - shift ownership and impact of a risk to another party
- Take Advantage (Opportunity):
  - positive effect if risk materializes

Repeatedly Damaged Infrastructure (23 CFR 667)

- A separate analysis is required of NHS assets repeatedly damaged
- This analysis should inform the risk management process
- TAMP must include NHS locations. Non-NHS is optional
- Must use reasonable efforts to obtain data to identify repeatedly damaged facilities
- Caltrans evaluated projects funded by federal Emergency Relief dollars from the past 10 years on both state and local system
- Solicit local agency locations – Must be NHS

Challenges in Evaluating Risk

- Numerous factors impacting how we perceive risks
  - Immediacy of effect
  - Degree of control over the risk
  - Chronic-catastrophic (size of population exposed to the risk)
  - Common-dread (emotional response to the risk)
- And a number of factors tend to introduce bias
  - Availability (likelihood or frequency)
  - Overconfidence
  - Desire for certainty

Source: Adapted from Slovic, et.al., "Facts and Fears: Understanding Perceived Risk," in Societal Risk Assessment, 1980

Levels at Which Risks are Identified

Enterprise

Enterprise: Risks to the organization's strategic objectives, or which involve multiple levels.

Responsibility: Senior executives, policy makers.

Program

Program: Risks that are common to groups of projects that achieve strategic goals.

Responsibility: Program managers.

Project

Project: Risks that are specific to individual projects.

Responsibility: Project managers.

Activity

Activity: Risks that are specific ongoing functions that support programs or projects.

Responsibility: Activity managers.

Should Risk be included in the TAMP?

Risk Categories	Can it be Anticipated	TAMP Treatment	Within TAMP or Elsewhere?
Succession Planning	Yes	Mitigate	Elsewhere
Continuity of Operation	Yes	Mitigate	Elsewhere
Changes in policy or priorities	No	Accept	N/A
Tort Liability	Yes	Mitigate & Accept	TAMP
Sudden Change in Funding	No	Accept	N/A
Gradual Funding Loss - Fed Tax paradox	Yes	Accept & Mitigate	TAMP
Changing legislation	No	Accept	N/A
Scour Vulnerabilities	Yes	Mitigate	TAMP
Seismic Vulnerabilities	Yes	Mitigate	TAMP
Geotechnical Vulnerabilities	Yes	Mitigate	TAMP
Climate Vulnerabilities	Yes	Mitigate	TAMP

California TAMP Risk Categories

- Asset Performance
- Highway Safety
- External Threats
- Finances
- Information and Decision Making
- Business Operations
- Project and Program Management

Risk Category 1: Asset Performance

Description	Elements of Risk Management
Risks associated with asset failure, which can include: • Structural • Capacity or Utilization • Reliability or Performance • Obsolescence • Maintenance or Operation	➢ Consistently documented inspection programs ➢ Documented allocation of funding for repair and maintenance ➢ Documentation of competing resource demands ➢ Determined intervention levels ➢ Prioritization actions and documented reasoning ➢ Monitoring

Risk Category 2: Highway Safety

Description	Elements of Risk Management
Risks to highway safety related to the asset management program: • Highway crash rates, factors and countermeasures • Safety performance of assets, maintenance and rehabilitation treatment options • Safety in project selection, coordination and delivery	➢ Safety included in asset management programs ➢ Network screening for safety hotspots for consideration within asset programs ➢ Consideration of safety benefits/costs in asset management decision making ➢ Safety related product evaluations ➢ Prioritization of actions and documented reasoning

Risk Category 3: External Threats

Description	Elements of Risk Management
External threats include both human-induced and naturally occurring threats, such as: • Climate change • Extreme weather • Seismic events • Terrorism or accidents • Paradigm shifting technologies	➢ Incorporate potential impacts of environmental conditions and new technologies into long term planning ➢ Identify and inventory external risks to existing infrastructure ➢ Infrastructure inspection, replacement or retrofit programs to mitigate risks ➢ Operational and emergency response programs ➢ Processes to incorporate resiliency into design standards

Risk Category 4: Finances

Description	Elements of Risk Management
Risks to the long term financial stability of the asset management programs, including: • Unmet needs in long-term budgets • Funding stability • Exposure to financial losses	➢ Programs to forecast changes in revenue and costs ➢ Programs to maximize available fund sources for asset management ➢ Exploration of innovative financing opportunities for asset management programs ➢ Exploration of innovative technologies to reduce maintenance and operational costs

Risk Category 5: Information and Decision

Description	Elements of Risk Management
Risks related to the asset management program include: • Lack of critical asset information • Quality of data, modeling or forecasting tools for decision making • Security of information systems	➢ Enterprise data management programs and strategies ➢ Robust information technology solutions emphasizing risk prevention, preparedness and recovery ➢ Programs to address model risks (e.g. premature failure of pavement due to underestimation of truck loading)

Risk Category 6: Business and Operations

Description	Elements of Risk Management
Risks due to internal business functions associated with asset management programs, such as: • Employee safety and health • Employee Attrition • Inventory control • Purchasing and contracting	➢ "Safety first" culture within asset management programs – routine safety meetings, documented safety and standard operating procedures, workforce training, etc. ➢ Robust systems and tools for work force, equipment, inventory, and contract management to reduce risks of theft, misuse, unnecessary storage or inaccurate estimates of program costs

Risk Category 7:
Project and Program Management

Description	Elements of Risk Management
Project and program management is a very mature area in U.S. transportation sector	➢ Many programs and products exist here – extensive discussion of these risks and related programs, policy and procedure is likely not necessary

Example of Risk Mitigation and Monitoring Approaches

Risk Statement:

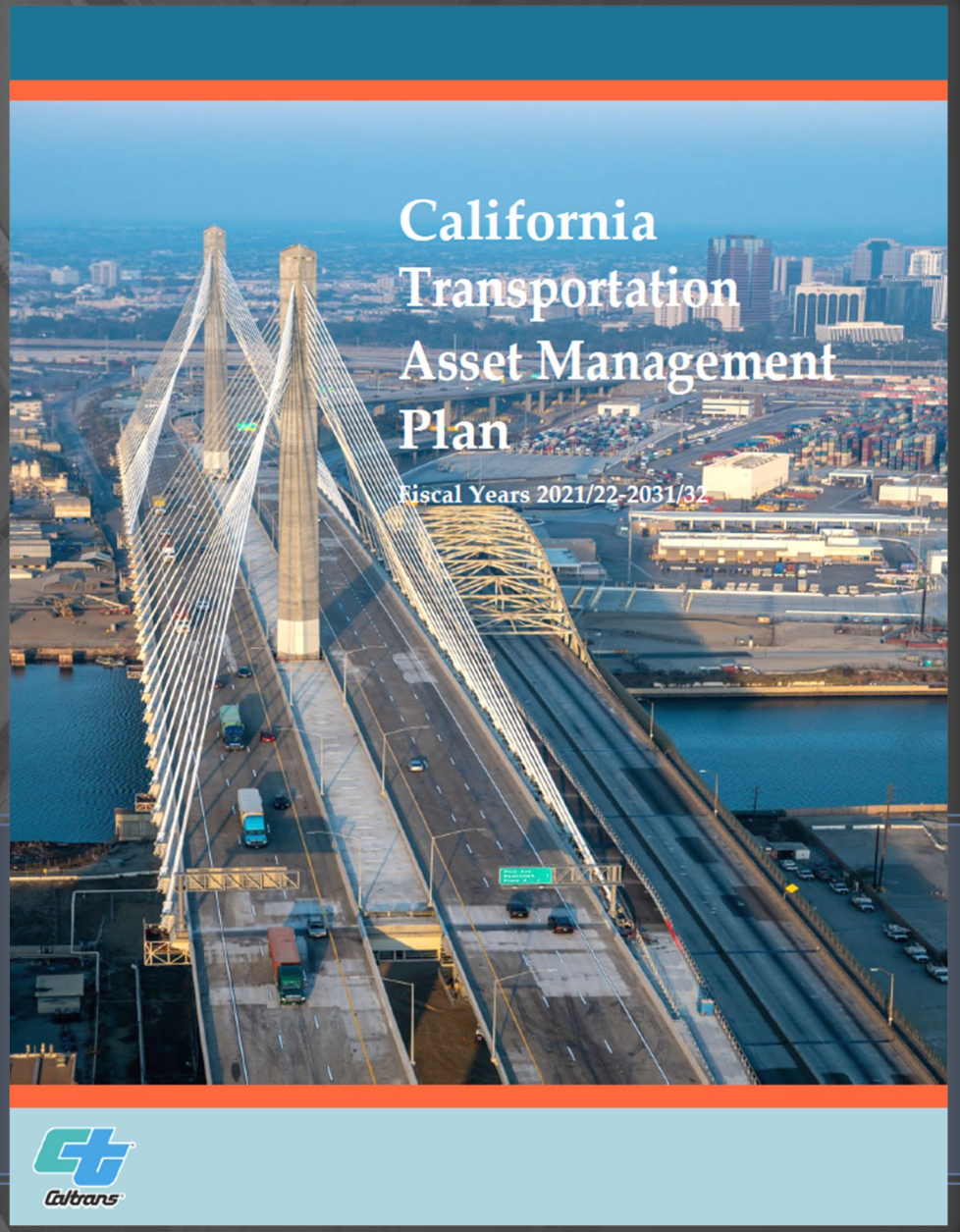
"If we don't plan for extreme weather events, then pavement and bridges will be damaged."

- **Risk Mitigation Approach:** Develop Vulnerability Assessments and Adaptation Plans. Develop priority risks within Agency, Region, District, State and use to prioritize funding/projects

- **Monitoring Approach:** Assign resources and develop implementation plan that includes scope, projects, timeline, costs, etc

Risk Management Process & Documentation

Loren Turner
Caltrans, HQ Asset Management



ISO 31000: Risk Management Process

ISO 31000 is an international standard that provides principles and guidelines for risk management. It outlines a comprehensive approach to identifying, analyzing, evaluating, treating, monitoring and communicating risks across an organization.

Source: NCHRP Project 20-24(74) Research Report, 2011

Risk Assessment

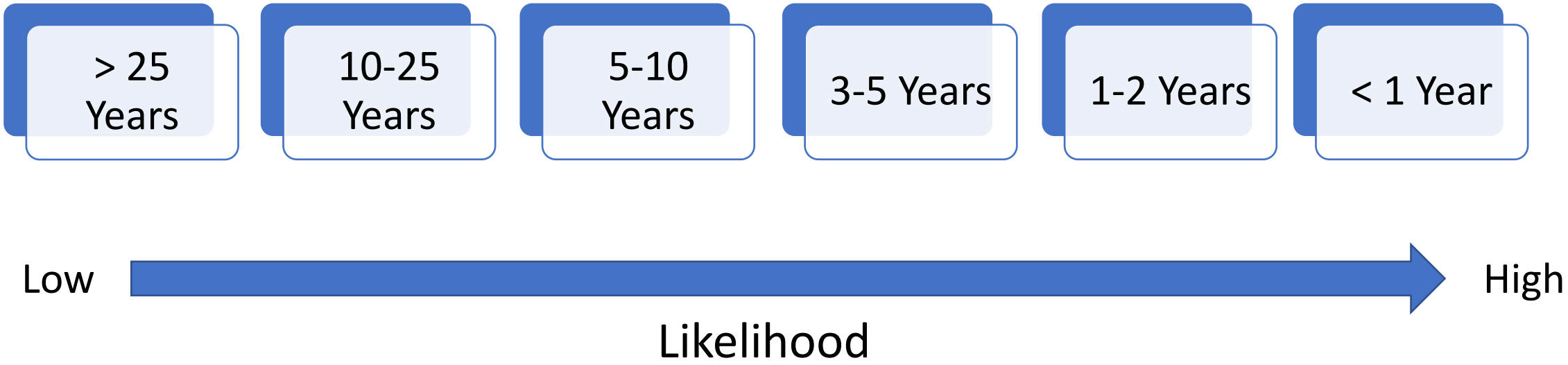
A key tool for conducting a risk assessment is the *Risk Consequence Matrix*

- Provides a common scale by which different groups can assess likelihood and impact of different risks.
- A risk's consequence is the product of its likelihood that it will occur times its impact.

Likelihood of Occurrence	No Impact or Cost	Short Term Lane Loss or Cost	Short Term Loss of Route or Medium Cost Impact	Long Term Loss of Route or High Cost	Loss of Critical Route or Very High Cost
< 1 yr	Med-Low	Medium	Med-High	High	High
1-2 Yrs	Med-Low	Medium	Med-High	High	High
2-5 Yrs	Low	Med-Low		Med-High	High
5-10 Yrs	Low	Med-Low		Med-High	High
10-25 Yrs	Low	Low			Med-High
> 25 Yrs	Low	Low			Med-High

Consequence

Likelihood That a Risk Will Occur (in Time)



Consequence or Impact to the Transportation System
(Options for Consequence)

No Cost	Low Cost	Medium Cost	High Cost	Very High Cost
No impact	Short term lane loss	Short term loss of route	Long term loss of route	Loss of critical route

Process for Identifying Risks

- Existing risks identified in the 2022 TAMP were reviewed to determine if they are still relevant today.
- Risks will be presented by risk categories for the existing TAMP risks.
- For risks not identified prior to this workshop, we will capture by chat during this workshop.
- We will conduct a risk assessment on all identified risks by online survey following the workshop.

Evaluating Risk Statements

Relevance: Is this risk relevant to your agency today?

Influence: Do you think the TAMP should be influenced by this risk?

- If so, this would impact the financial plan and investment strategies

Statement: Do you think the risk statement is accurately represented?

- You will have opportunity to include additional risks during workshop

Keep in Mind: A risk statement is formed by an “IF-THEN” statement

Asset Performance Risks

- If we make projects more complex (by the addition of multiple assets) and involve complete streets, etc., project delivery may be delayed.
- If we do not coordinate the needs of each asset class or project work, we may not be as efficient as possible (e.g., may be removing new pavements to place new culvert or working on TMS by replacing both technology and structure when only one component is needed.)
- If we defer maintenance future costs may be higher
- If rainfall intensity continues recent trends, then existing culverts may not perform adequately.
- If pedestrian and bicycle facilities needs are not captured accurately then investment decisions may not be appropriate, and safety may be compromised

Highway Safety Risks

- If crash reporting is not modernized, we may not accelerate some aspects of safety improvements. – Mitigated!
- If funding for safety improvements is not available, then the fatal and serious injuries could increase (bridge rail, railroad crossings, lighting, roundabouts, bike and ped etc.)

External Threats

- If we don’t plan for extreme weather events (rainfall, sea level rise, fire, heat, etc.), then our transportation system components (bridges, roadways, etc.) could be damaged, pose safety risks and cost more.
- If the cost of electrification is not funded then funding for asset conditions may need to be redirected.
- If vehicle weights are allowed to increase the rate of asset deterioration may be greater and possibly less reliable.
- If vegetation management is not performed, then the system could be at greater risk of closure due to wildfire, trees falling or slides.

Financial Risks

- If money is spent on the four core assets (bridges, pavements, drainage systems, ITS) most in need, there may not be enough funding for maintaining new inventory or for other critical assets.
- If the available funding does not cover our needs, then we still will have some deferred maintenance and operation's needs.
- If new funding for local bridges is not secured, then necessary maintenance of bridges will be delayed and bridges in good repair could slide into fair and/or poor condition.
- If we don't program projects and report expenditures by NHS designation and by the federal work types, then investment in pavement and bridges on the NHS will not be accurately identified

Financial Risks

- If greater use of toll roads were implemented, then there would be more funding for transportation.

Information and Decision Risks

- If we do not have reliable asset performance models (including reliable deterioration rates and reasonable goals), then investment decisions will not be optimal.
- If management systems are not used to predict future needs, then the TAMP may not reflect accurate costs
- Opportunity- If we adopt autonomous vehicles then we could improve safety.

Business & Operation Risks

- If infrastructure is exposed or vulnerable to IT security/ransomware/ hacking issues, then asset or data systems can be out of function for an extended time.

Any Additional TAMP Risks?

Use "Chat Box" to identify additional risks

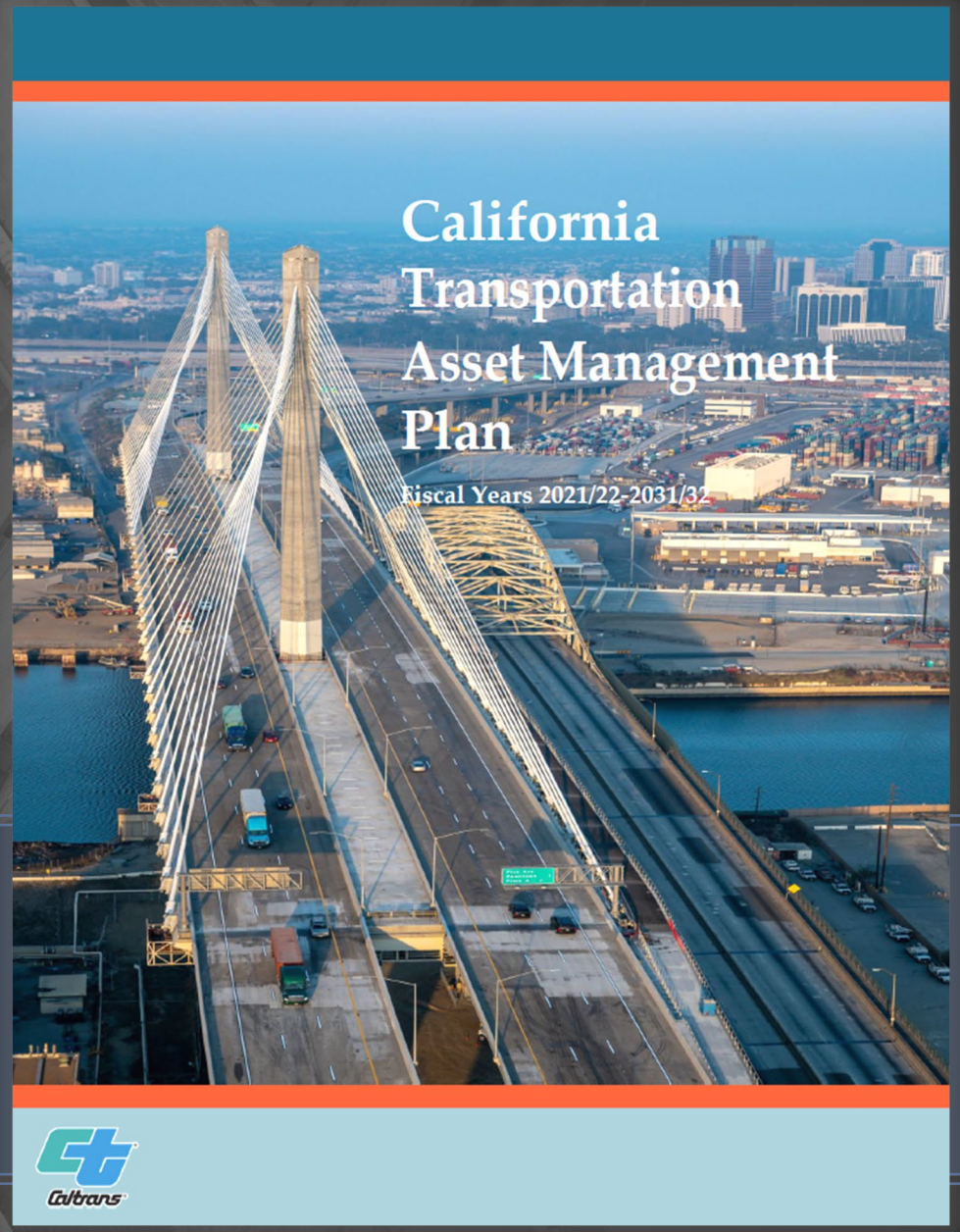
Risks need to be in the form of a risk statement

Example:

- If allowable truck weights increase, then we may need to divert funds to strengthening bridges.
- If "X" then "Y"
- X = "allowable truck weights increase"
- Y = "we may need to divert funds to strengthening bridges"

Closing Remarks

Michael B. Johnson
Statewide Asset Management Engineer
Caltrans, HQ Asset Management



Next Steps – Risk Management Workshop #2

- Participant survey of likelihood and consequence rankings (via e-mail)
- Reconvene on Thursday, May 15, 2025 at 10 AM
- Recap Results from Day 1 of the Workshop
- Identify mitigation strategies and monitoring for high priority risks
- Discuss more regarding identification and verification of Repeatedly Damaged Assets with focus on local NHS

Questions?

Contact: CT-TAM@dot.ca.gov