Observations on Transportation Agencies' Development of Project Risk Management Programs

Travis McGrath, Ph.D., P.E.

October 27, 2008

Golder Associates

Overview

- Involved with half a dozen agencies' programs for project and program cost-and-schedule risk assessment and risk management
  - State and Provincial-level agencies
  - Federal-level agencies
- Conducted assessments on nearly 200 projects since 2002, with updates for many over time

Overview

- Offer external perspective on some lessons learned and continuing challenges
- Observations on
  - Technical issues (i.e., what ‘guidebooks’ for conducting risk assessment typically address), as well as
  - Real-world implementation issues that guidebooks don’t address

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program

Recognize the Need

- Program and project outcomes are difficult to predict with certainty, due to uncertainty in both internal and external factors, such as:
  - Funding – amount and timing
  - Public desires and other political factors
  - Policy changes
  - Technical issues
- Many agencies ultimately recognize the need for decision support
  - Ad hoc
  - Structured, such as through a formal risk assessment / risk management program

Recognize the Need

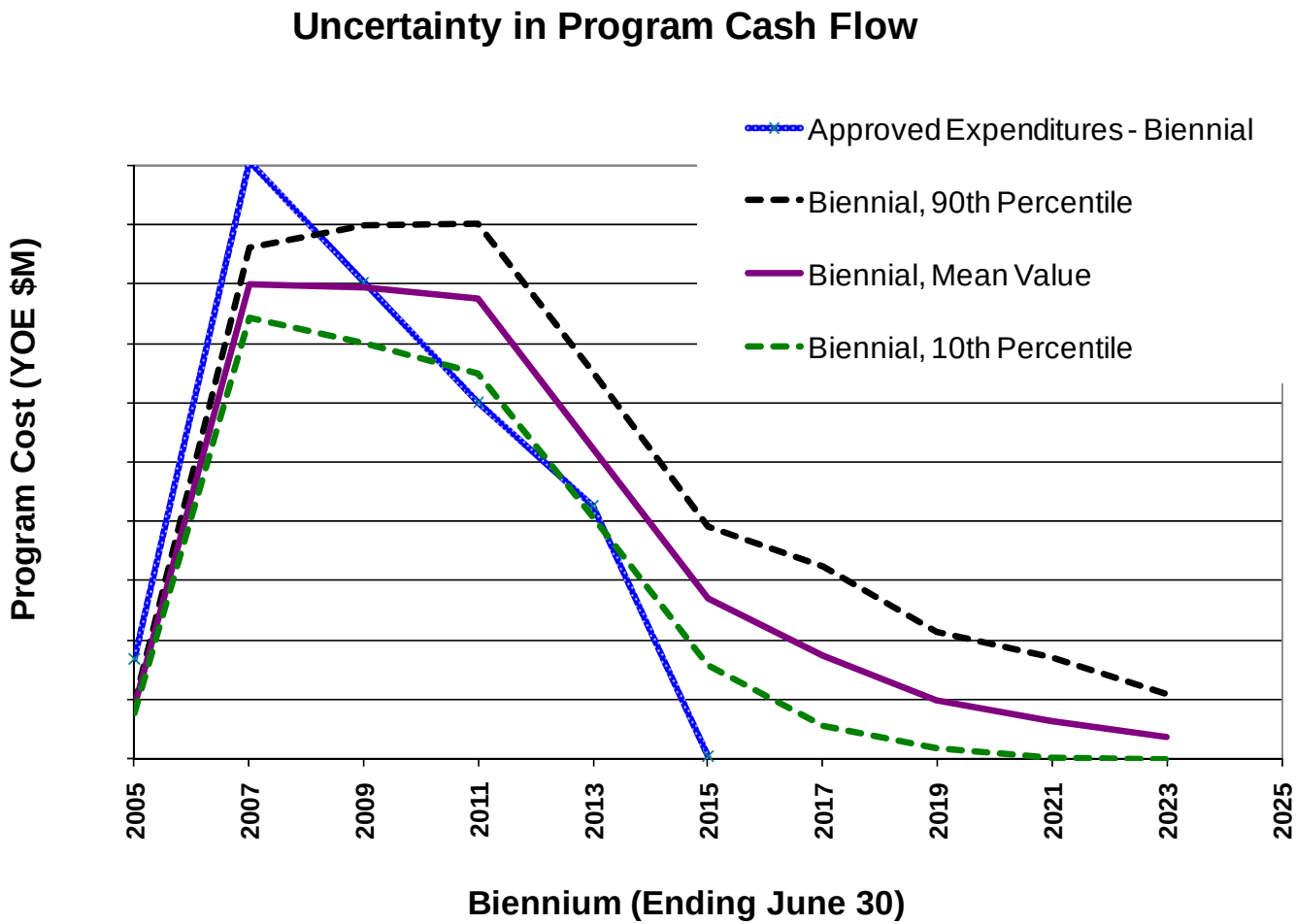
Risk Management

Recognize the Need

Potential objectives for a risk management program include:

1. Meet an external requirement for RA/RM
2. Quantifying uncertainty in project cost and schedule (or other measures) to:
   - Increase confidence in cost and schedule estimates (with or without external validation)
   - Increase accountability to stakeholders
   - Help choose among design alternatives based on comparative analyses
   - Help make funding decisions
     - Funding requests
     - Allocation of funding among projects
     - Cash flow to meet constraints

Example of risk-based evaluation of program cash flow



Recognize the Need cont'd

Potential objectives for a risk management program include:

3. Identifying and prioritizing critical risks and key opportunities to:
   - Enable risk management
   - Enable Value Engineering (note: RA/RM and VE/VA can be integrated)
   - Establish program (or project) management reserves or contingencies
4. Increasing project and program understanding and communication

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program

"Try it Out"

Experiment with:

- Defining and refining objectives for the risk management program, including:
  - Strategic goals for the program
  - External validation *versus* not
  - Types of results and how they can be used

Note: needs and objectives for the program tend to change over time

"Try it Out"

Experiment with:

- Methods for gathering information. For example:
  - Retain independent subject-matter experts for external perspective *versus* using only internal resources
  - Staffing efficiency
    - Structured workshops attended by everyone *versus*
    - Less-intensive, small-group interviews

"Try it Out"

Experiment with:

- Different approaches to risk assessment:
  - Project-by-project assessments *versus* programmatic assessment (or perhaps do both)
  - Externally led *versus* internally led

"Try it Out"

Experiment with:

- Different approaches to risk assessment:
  - Risk identification and rating only (qualitative or semi-quantitative)
    - Used solely to enable risk management
    - No review of 'baseline' cost or schedule
    - No quantification of uncertainty in total project cost or schedule

versus

"Try it Out"

Experiment with:

- Different approaches to risk assessment:
  - Quantitative evaluation of project (or program) cost and schedule, in various possible ways, including
    - Validating and de-biasing the cost and schedule estimates *versus* not
    - Quantifying "base" uncertainty *versus* not
    - Identifying and quantifying individual cost and schedule risks *versus* 'lumped' activity-level assessments

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program

Decision to Proceed…Or Not

After a few trial assessments, the agency typically decides whether to proceed with a program:

1. If No, then the effort "dies on the vine"
   - Agency's financial and decision systems not 'set up' to incorporate results
   - Lack of support from within
     - 'We don't need these tools'
     - Don't trust the process or results

Decision to Proceed…Or Not

After a few trial assessments, the agency typically decides whether to proceed with a program:

2. If Yes, then form an initial program by:
   - Having internal (agency) resources follow what other agencies have done, or
   - Using consultants to develop and run a program, or
   - Using a “hybrid” approach (e.g., external consultants initially but evolve into a program that is run by the agency)

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program
  - Early on
  - Over time
  - At maturity

Implement the Program: Early On

- The agency has limited experience, so it generally relies on others for help in conducting the workshops, modeling, reporting, and interpretation
- The process is “novel”, so have good attendance by curious agency staff, including both management and subject-matter experts

Implement the Program: Early On

- Earn “buy-in" to new approach. Either:
  - Agency has great enthusiasm at many levels within the agency and support from consultants, or
  - Agency meets an overall ‘net’ resistance to the concept of risk-based assessments
    - “What we’ve done before has always worked, so why do something different” or
    - “I am threatened by the potential clarity or transparency of the project plan if the risk assessment is done” (*this is more common when projects are competing for funding*)

Implement the Program: Early On

- Use of results. Either:
  - Agency embraces risk-based results and the corresponding benefits to making decisions under uncertainty, or
  - Agency has some difficulty figuring out what results mean or how to use them
    - Often a function of
      - Poor effort of educating the agency by those conducting the risk assessments, or
      - Providing the wrong types of results, or
      - Internal systems not being able to incorporate risk-based results

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program
  - Early on
  - Over time
  - At maturity

Implement the Program: Over Time

- Each agency develops its own “style” for conducting risk assessments
- This style flows from the agency’s existing culture, including
  - The willingness/ability of staff to participate in repeated or frequent risk assessments, and
  - The willingness of managers to engage in the assessments and make use of the results

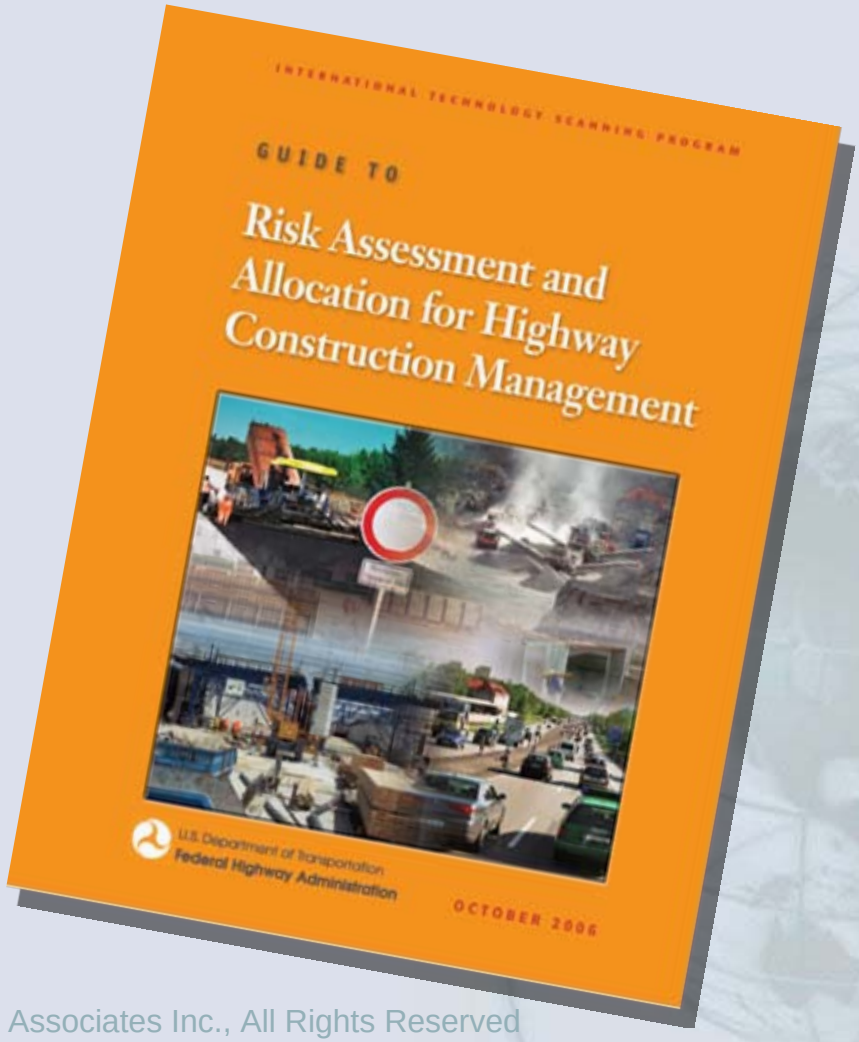
Implement the Program: Over Time

The agency develops guidance and policy for the conduct of assessments and use of results:

- Which types of results are to be developed and reported, based on how the agency plans to use the results. For example:
  - Uncertainty in overall project cost and schedule, sometimes compared to budgets when available
  - Uncertainty in component costs (engineering, right-of-way, and construction)
  - Uncertainty in project cash flows (expenditures or revenues, sometimes by component)
  - Uncertainty in key milestone dates (internally or politically driven)
  - Risk rankings / sensitivities
  - Potential risk-management actions (cost-effective)

Implement the Program: Over Time

Example guidance document



Implement the Program: Over Time

The agency develops guidance and policy for the conduct of assessments and use of results:

- Which issues should be treated programmatically (i.e., common factors among individual projects), such as
  - Major funding assumptions (e.g., uncertain passage of major funding package in an upcoming election)
  - Commonality in major design standards, such as seismic, storm water/drainage, and ITS/ATMS
  - Unit prices for major construction items
  - Market competition / contractor pricing strategies

Implement the Program: Over Time

The agency develops guidance and policy for the conduct of assessments and use of results:

- Exclusion of particular issues from the risk assessments (i.e., risks that are “off limits” for the risk assessment, for whatever reason), such as
  - Reduced funding
  - Delays in funding (project-by-project or across a program) or constrained project cash flows
  - Significant change in the “purpose and need” (definition) for the project
  - Uncertainty and risk in cost inflation rates
  - Loss of political support or major political battles surrounding a particular project
  - Other “project canceling” risks (risks that would stop or cancel the project)

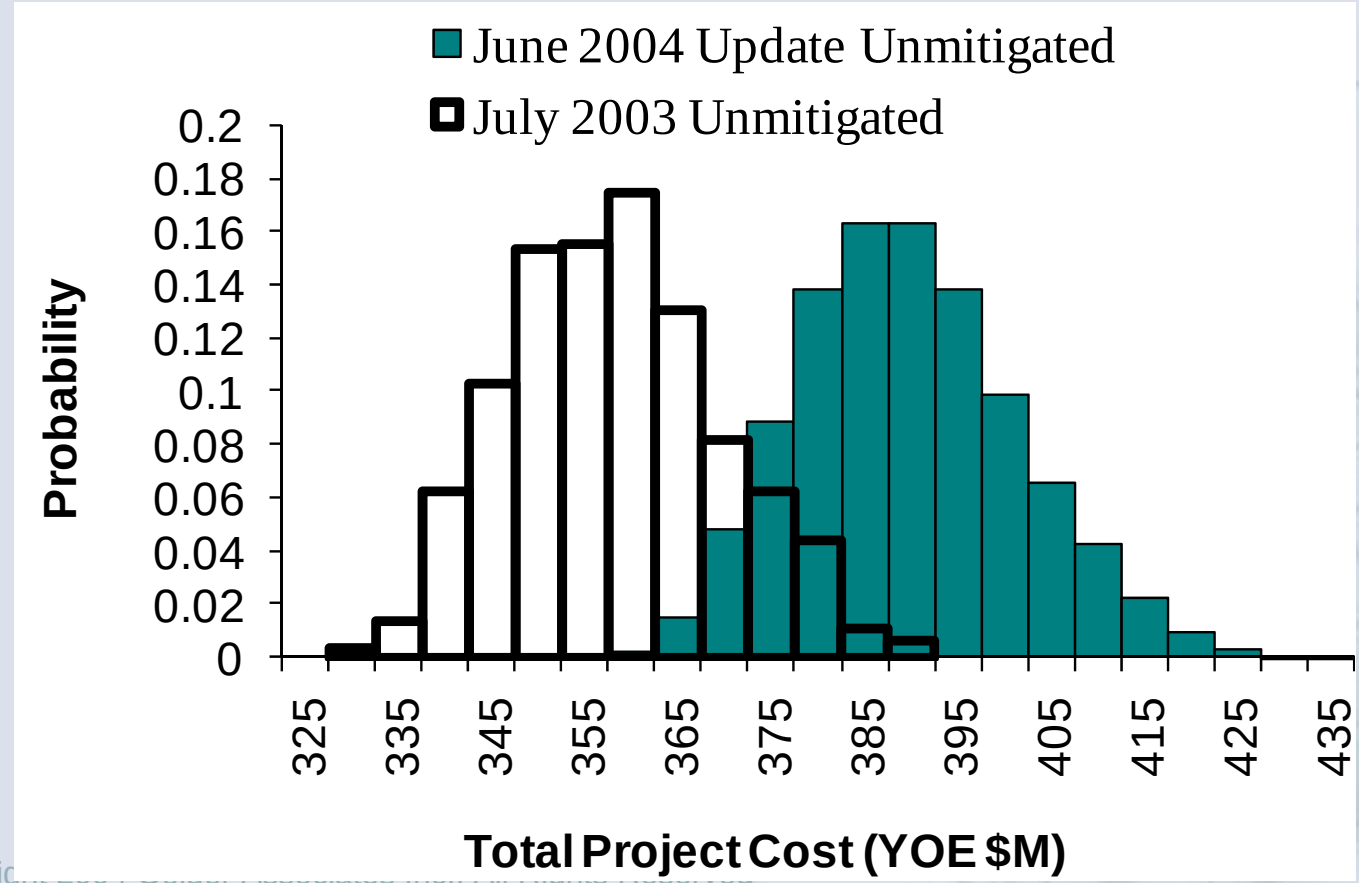
Implement the Program: Over Time

Comments on excluding significant issues:

- Excluding major risks and uncertainties makes the results:
  - Conditional on, or constrained by, key assumptions being true, which is often forgotten
  - Underestimate the true uncertainty, and perhaps inaccurate as well
  - Ephemeral (results don't hold up over time)
  - Lead to questions about the validity of the risk management program
- *If there is a good reason for an exclusion, the impact should still be quantified by running an 'unconstrained' scenario for comparison*

Implement the Program: Over Time

Results not holding up over time:
All-in-one example of the impact of both exclusions and over-optimism



Implement the Program: Over Time

The agency develops guidance and policy for the conduct of assessments and use of results:

- How and when risk assessments should be conducted, including:
  - Full-time attendance by project staff and subject-matter experts *versus* targeted attendance (*better multi-disciplinary discussions versus reduced cost*)
  - Use of consultants *versus* internal staff (*if internal staff, should be adequately trained*)
  - Technical approach to risk assessment (*approach should be technically correct and consistent with objectives*)
  - Which projects should conduct risk assessments, and when (*including integration with VE; scale of effort; timing of updates if any*)
- Reporting (formats and content)

Outline

Observations organized in terms of stages of a program's development:

- Recognize the need
- Conduct trial risk assessments
- Decide to develop a program (or not)
- Implement and refine the program
  - Early on
  - Over time
  - At maturity

Implement the Program: At Maturity

- Agency will have begun to evaluate how its program is performing. For example:
  - Is the program meeting the objectives originally set for it (e.g., helping the agency to make project-related decisions)?
  - Are the risk assessment results holding up over time?
    - Impact of earlier exclusions begins to show up
    - Impact of earlier bias (over-optimism) begins to show up

Implement the Program: At Maturity

- Integration with project-management culture. Either:
  - Risk assessment becomes part of the project management culture
    - Leads to an overall greater understanding of how to participate, use results, manage risk, etc.

  or

  - The agency sees limited value, and either
    - Cancels its program, or
    - Re-defines it to do something else (e.g., establish project-level management reserves instead of quantifying uncertainty in cost and schedule)

Implement the Program: At Maturity

- The agency staff might begin to suffer from 'risk assessment fatigue'. For example:
  - Senior project leaders attend less often ("pop in and out" or don't show up at all)
  - Frequently-tasked agency subject-matter experts become less willing to attend other than for brief windows of time (e.g., HQ geotech specialist)
- In both cases, reduced participation
  - Degrades assessment quality
  - Reduces acceptance / "buy-in" of results
- *Can't let this happen!*

Implement the Program: At Maturity

- While uncommon, some project leaders begin to “game the system”
  - They figure out how their agency is using the results
  - If they foresee (or receive) an unfavorable result, they might attempt to influence the ultimate outcome:
    - Bias their or their team’s assessments during the workshop
    - Change assessments after results have been presented
    - Discredit the risk assessment
    - “Bury” the results

Implement the Program: At Maturity

- Our experience is that this motivational (leadership) bias is more likely to occur when:
  - Projects within a program are competing with each other for funding
  - A particular project is highly visible from a political perspective
  - The individual project director has great ambitions for “climbing the ladder”

Summary and Recommendations

- Develop clear objectives for a risk management program
- Provide top-driven guidance and policy early on
- Ensure "*command emphasis*" - consistent and effective participation of senior leaders during risk assessments
- Watch for – and mitigate – bias, especially when projects are competing for funding