Project Management Institute
1st Annual Professional Development Day

Schedule Risk Assessment

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Schedule Risk Assessment – Why Do It?

➢ To determine the likelihood of finishing on time

➢ Tasks in a schedule typically reflect the “most likely” duration for each task

➢ In reality, each task is different and has a varying degree of probability of finishing within or after the duration specified

➢ Schedule risk assessment quantifies these probabilities by assigning values to each task
Schedule Risk Assessment – Basic Process

1. Obtain schedule for analysis
2. Are prerequisites met?
   - No constraints?
   - Complete logic?
   - All work included?
   - Detailed enough?
   - Task durations realistic?
3. Set minimum, maximum, most likely durations
4. Assign probability distribution curves
5. Correct problems
6. Perform risk analysis calculations
7. Evaluate for/assign values as required for special conditions
   - Probabilistic branching
   - Conditional processing
   - Correlated risk factors
8. Analyze Results
Schedule Risk Assessment
Special Conditions

➢ Probabilistic branching considers the situation where the outcome of a task can result in two or more possible courses of action

➢ Conditional branching addresses the impact of external influences, such as weather

➢ Correlated risk exists when two or more tasks are affected by some other event

➢ A negative correlation suggests that what happens to one will cause the opposite to happen in the other

➢ A positive correlation suggests that what happens to one is likely to happen to the other
Schedule Risk Assessment

Calculations

A random method is used for selecting possible values in a range.

- Monte Carlo – Speedier method, but has a larger possibility of sampling error.

An iteration is selecting one sample point from each task and calculating the outcome.

These calculations are performed by software – the user specifies the number of iterations.
## Schedule Risk Assessment
### Results Analysis

**Date:** 07/25/2002 9:58:36 AM  
**Samples:** 500  
**Unique ID:** 0  
**Name:**

- **Completion Std Deviation:** 22.09 d  
- **95% Confidence Interval:** 1.94 d  
- **Each bar represents 10 d**

### Completion Probability Table

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**Initial Analysis (Duration -5% to +40%)**

[Logo: NASA]
Schedule Risk Assessment
Results Analysis

➢ Critical Path Analysis – indicates whether or not a task is "risk critical" (i.e. during iterative calculations, whether or not it becomes a critical task)

➢ If critical, indicates percentage of time during simulation

➢ Sensitivity Analysis – indicates the potential impact an activity has on the overall project or program completion

➢ Task duration

➢ Minimum and maximum durations
Schedule Risk Assessment
Prerequisites

- Constraints (artificially induced dates) affect risk calculations – takes probability out of the equation
- Incomplete logic networks (missing relationships between tasks in a schedule) lead to incorrect representations
- Missing tasks create incomplete and incorrect results
- Descriptions should be complete and clear to better enable the assignment of risk parameters
- Tasks that are too large (i.e. have large durations) lead to results with large ranges.
Schedule Risk Assessment
Duration Assignment

➢ The original duration specified in the schedule is assumed to be the “most likely”

➢ The minimum, or optimistic, duration is the least amount of time required or allowed to complete the task, if everything goes perfectly

➢ The maximum, or pessimistic, duration is the greatest amount of time required or allowed to complete the task, if everything goes wrong

➢ A quick method - One can assume a “baseline” range for all tasks or a group of tasks in a schedule (one example, -5% to +40%) in lieu of evaluating each task separately
Schedule Risk Assessment
Duration Assignment

➤ One must consider specific risks in making optimistic and pessimistic value assignments
➤ Nature of the work
➤ Past history
➤ Technology Readiness Level (TRL)
➤ “Knowns” and “Unknowns”
➤ Project or Program risk evaluations

➤ One method used is to assign a “base” range and modify tasks using a project/program specific risk matrix
Schedule Risk Assessment
Probability Distribution Curves

- The PDC is a way to indicate the likelihood of values between the optimistic and pessimistic values.

- A PDC can be:
  - Uniform (flat)
  - Normal (bell shaped)
  - Beta (skinny bell shaped)
  - Triangular (pyramid shaped)
  - Customized (other user defined shapes)