Project Management Institute
1st Annual Professional Development Day

Schedule Risk Assessment

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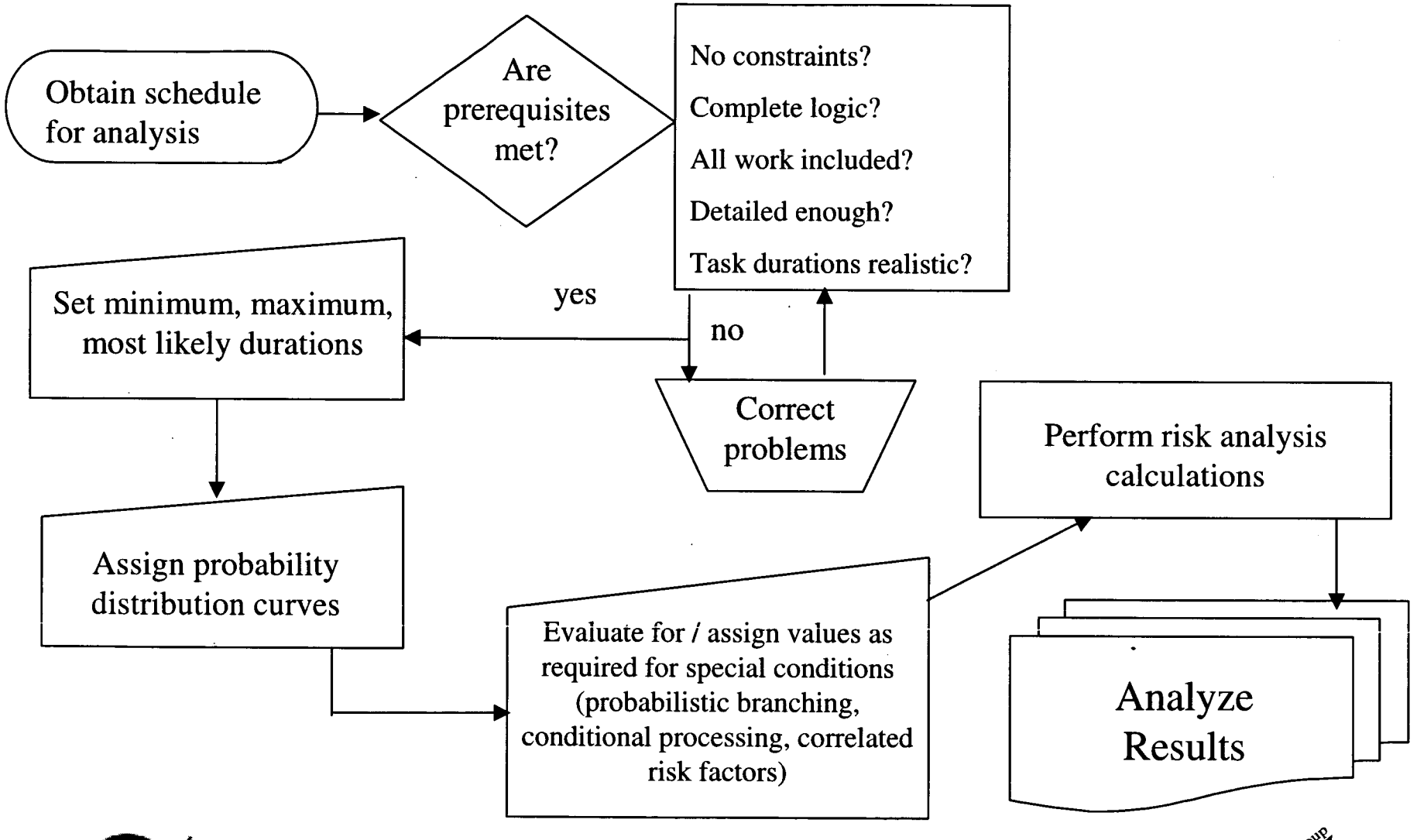
Schedule Risk Assessment – Why Do It?

- 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



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

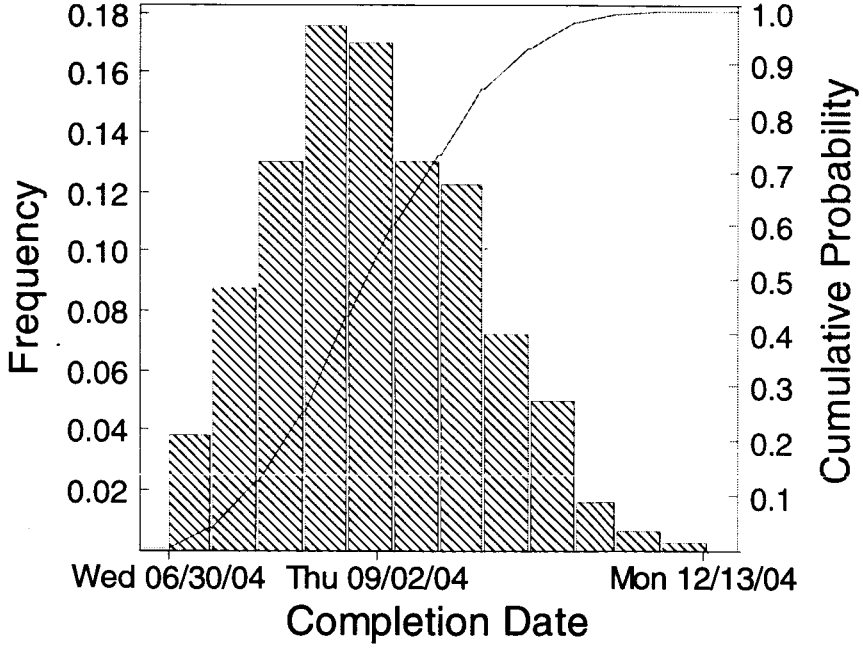
Schedule Risk Assessment Calculations

- A random method is used for selecting possible values in a range
  - Monte Carlo – Speedier method, but has a larger possibility of sampling error
  - Latin Hypercube Sampling (LHS) – Slower method, reduces 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

Prob	Date	Prob	Date
0.05	Mon 07/19/04	0.55	Fri 09/03/04
0.10	Mon 07/26/04	0.60	Wed 09/08/04
0.15	Fri 07/30/04	0.65	Tue 09/14/04
0.20	Thu 08/05/04	0.70	Fri 09/17/04
0.25	Wed 08/11/04	0.75	Fri 09/24/04
0.30	Tue 08/17/04	0.80	Wed 09/29/04
0.35	Thu 08/19/04	0.85	Wed 10/06/04
0.40	Tue 08/24/04	0.90	Thu 10/14/04
0.45	Fri 08/27/04	0.95	Wed 10/27/04
0.50	Tue 08/31/04	1.00	Mon 12/13/04

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

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.

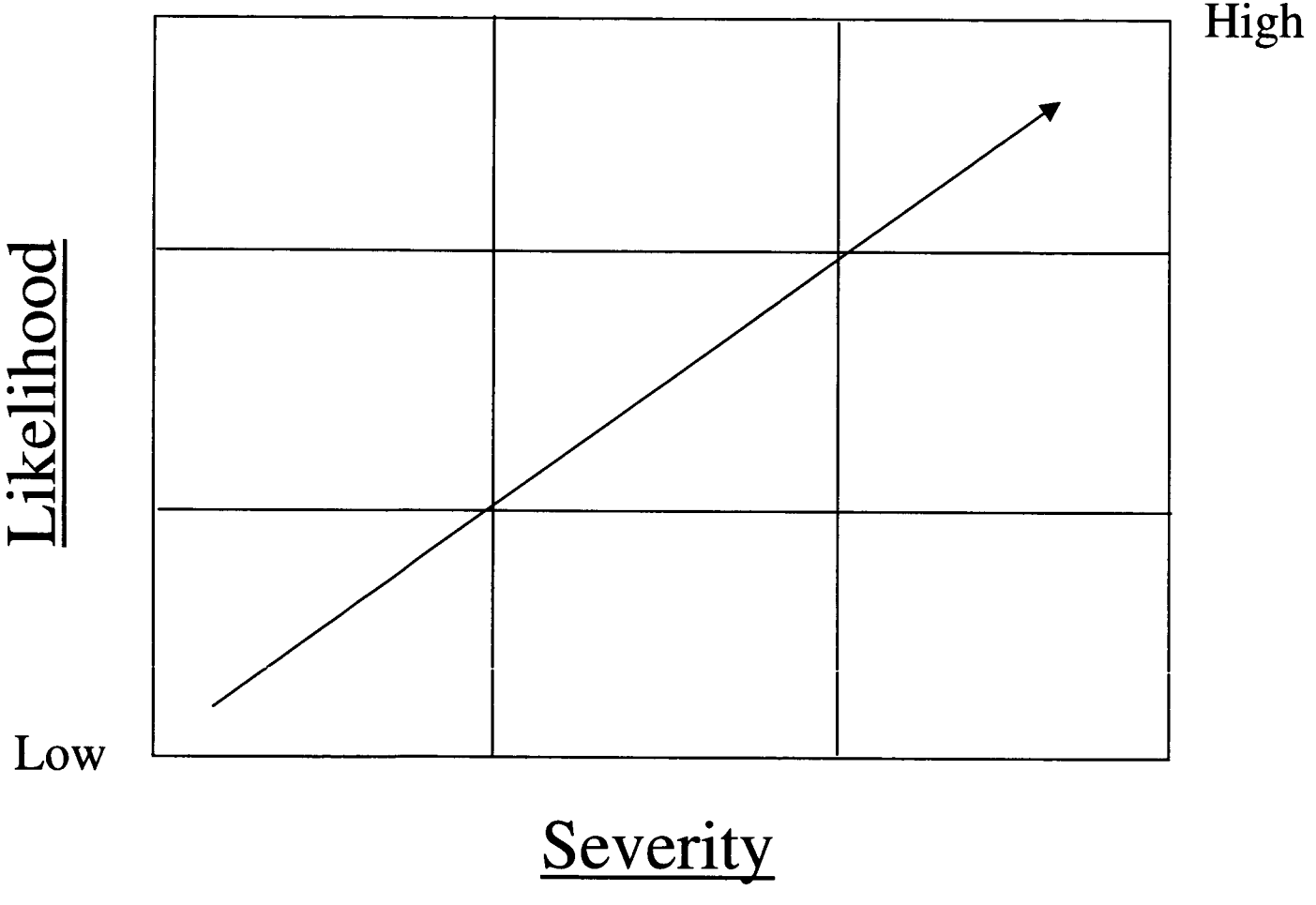
Schedule Risk Assessment
Duration Assignment

- 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
Sample 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)