3.4 Risk Management

What is a Risk?

- Risk is an unwanted event that has negative consequences

- Distinguish risks from other project events
  - Risk impact: the loss associated with the event
  - Risk probability: the likelihood that the event will occur

- Quantify the effect of risks
  - Risk exposure = (risk probability) x (risk impact)

- Risk sources: generic and project-specific
3.4 Risk Management
Quantifying Risk Impact

- The impact risk (severity) is an estimate of the impact to technical performance, cost, and schedule if the risk occurs.
- Impact can be quantized to low, medium, and high.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Performance</th>
<th>Schedule</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Minimal or no impact, unimportant</td>
<td>Minimal or no impact</td>
<td>Minimal or no impact</td>
</tr>
<tr>
<td>Medium</td>
<td>Acceptable with reduction in margin</td>
<td>Additional resources required, Minor slip in key milestones (&lt;20% slip in total schedule)</td>
<td>Cost estimates exceed budget by &lt;7%</td>
</tr>
<tr>
<td>High</td>
<td>Acceptable with no remaining margin; Unacceptable</td>
<td>Major slip in key milestones or Critical Path impacted (&gt;20% slip in total schedule)</td>
<td>Cost estimates exceed budget by &gt;7%</td>
</tr>
</tbody>
</table>

3.4 Risk Management
Quantifying Risk Probability

- Risk Probability – likelihood an event will occur
- Risk Probability can be quantized to low, medium, and high.

<table>
<thead>
<tr>
<th>Likelihood of Occurrence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 – 30% change this risk will occur</td>
</tr>
<tr>
<td>Medium</td>
<td>30% - 80% chance this risk will occur</td>
</tr>
<tr>
<td>High</td>
<td>80% - 100% change this risk will occur</td>
</tr>
</tbody>
</table>
3.4 Risk Management

Prioritizing Risk

Focus on those items with the highest risk level

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<td>High</td>
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</tbody>
</table>

**Risk Level**

- **HIGH** – unacceptable. Major disruptions to the project/program likely. Different approach dictated. Additional management attention required.
- **MEDIUM** – Some disruption to the project/program. Alternative approaches should be investigated to reduce risk. Additional management attention may be required.
- **LOW** – Minimum impact. Minimum oversight needed to ensure risk remains low.

3.4 Risk Management Activities

Risk Management Activities

- Risk assessment
- Risk identification
- Risk analysis
- Risk prioritization
- Risk reduction
- Risk control
- Risk management planning
- Risk resolution

- Checklist
- Decomposition
- Assumption analysis
- Decision driver analysis
- System dynamics
- Performance models
- Cost models
- Network analysis
- Decision analysis
- Quality risk factor analysis
- Risk exposure
- Compound risk reduction
- Buying information
- Risk avoidance
- Risk transfer
- Risk reduction leverage
- Development process
- Risk element planning
- Risk plan integration
- Risk mitigation
- Risk monitoring and reporting
- Risk reassessment
3.4 Risk Management

Risk Management Activities (continued)

• Three strategies for risk reduction
  § Avoiding the risk: change requirements for performance or functionality
  § Transferring the risk: transfer to other system, or buy insurance
  § Assuming the risk: accept and control it
• Cost of reducing risk
  § Risk leverage = (risk exposure before reduction – risk exposure after reduction) / (cost of risk reduction)

Sidebar 3.4 Boehm’s Top Ten Risk Items

• Personnel shortfalls
• Unrealistic schedules and budgets
• Developing the wrong functions
• Developing the wrong user interfaces
• Gold-plating
• Continuing stream of requirements changes
• Shortfalls in externally-performed tasks
• Shortfalls in externally-furnished components
• Real-time performance shortfalls
• Straining computer science capabilities
Risks for your Project

- What risks do you have?
  - Impact levels (low, medium, high)
  - Likelihood (low, medium, high)

- What risks have already occurred?
  - Mitigation?
  - Impact on project?
  - Risk reduction strategy?