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Strategic Risk Management

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Michigan Oracle User Summit

November 30, 2011

Top 10 Reasons We Don't Do Risk Management



10. We are all OPTIMISTS at heart.
9. Hope is ALWAYS a strategy.
8. We all remember some lucky project.
7. Don't lessons learned fix everything?
6. Are you feeling lucky today? (Punk!)
5. Who wants to display uncertainty/ignorance?
4. Spouting whales get the spear!
3. Risk management is really DEPRESSING.
2. We have no DATA.
1. This is planning and we need to get to WORK!

Top Reasons for Doing Risk Management

- Identify potential problems
- Handle them proactively
- Be their masters, not their slaves
- Keep them in mind
- Learn from them
- Protect project objectives
- Cover our butts!





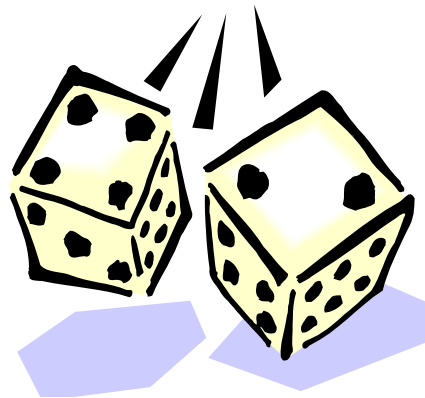
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Strategic Risk Management – Agenda

| | |
|---|-----------|
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Exercise 1: Classic Buffer

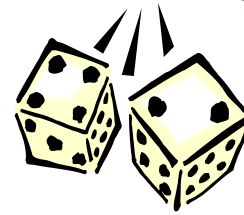
1. **ROLL YOUR DIE!**
2. **Check the number that comes up.**
3. **Look the result up in the table.**



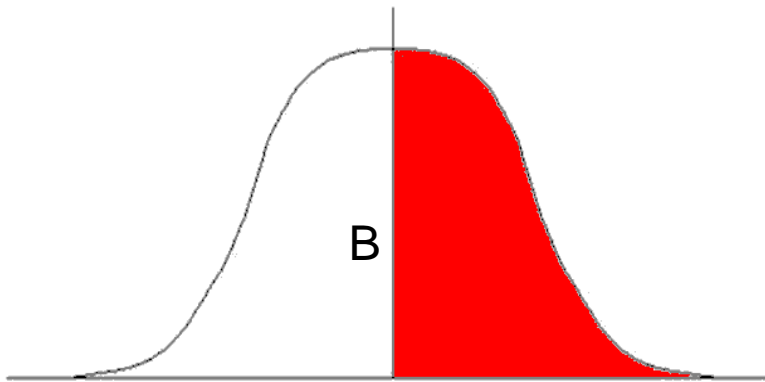
| Number | Result |
|--------|---------|
| 1 | Success |
| 2 | Success |
| 3 | Success |
| 4 | Failure |
| 5 | Failure |
| 6 | Failure |

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Analysis of Exercise 1



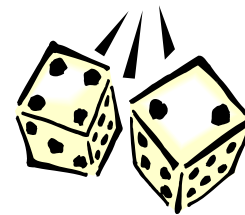
‘Project Managers’ who count on $B = \text{SUM}(r_i * p_i)$ take a **50%** chance it will cover their risks.



| Number | Result |
|--------|---------|
| 1 | Success |
| 2 | Success |
| 3 | Success |
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Classic Buffer Calculation

- **For each risk, multiply its impact times its probability, to get its exposure**
- **Add them all together to estimate a buffer or reserve**
 - **Do this for costs**
 - **Do this for duration**
 - **Do this for effort**



Set Buffer = Exposure

$$B = \text{SUM}(r_i * p_i)$$

Where:

r_i = impact of risk(i), $i = 1$ to n

p_i = probability of risk(i), between 0 and 1.0

B = total risk buffer estimated for any dimension of impact:

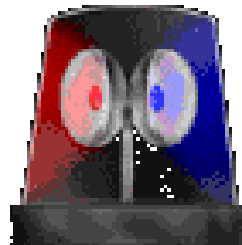
- cost
- duration
- effort, etc.



The Problem

Based on $B = \text{SUM}(r_i * p_i)$

**HALF of your projects will
be late or over budget!**



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Big Questions

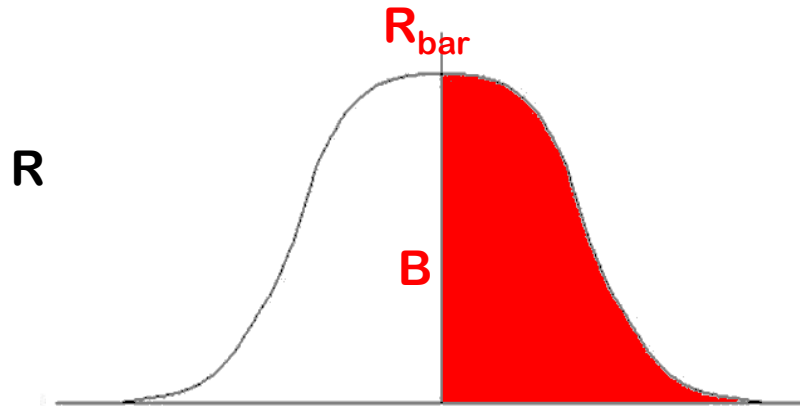


Would you start a project knowing there was a **50** percent chance it will be late based on risks alone?

Would your customers accept having **50%** of their projects being over budget?

Why the Problem?

The random variable to reflect the sum of risk outcomes has a distribution that looks like this:



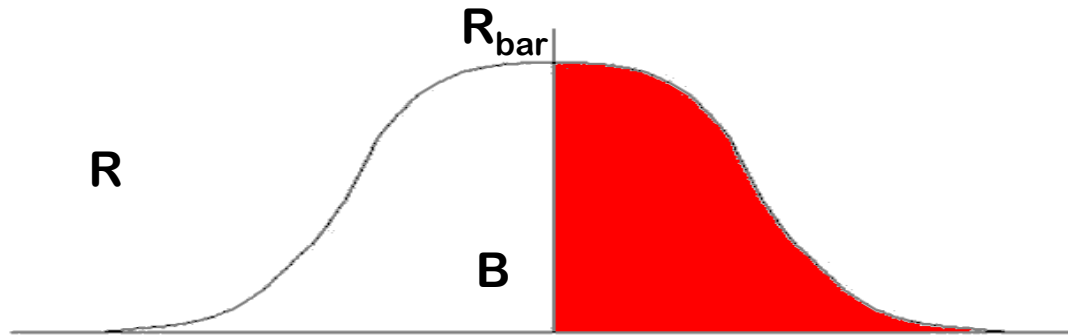
The buffer to protect the project from these risks, **B**, is commonly set to the expected value for the sum of manifested risks, R_{bar} .

But, **50%** of the outcomes will be greater than **B**.

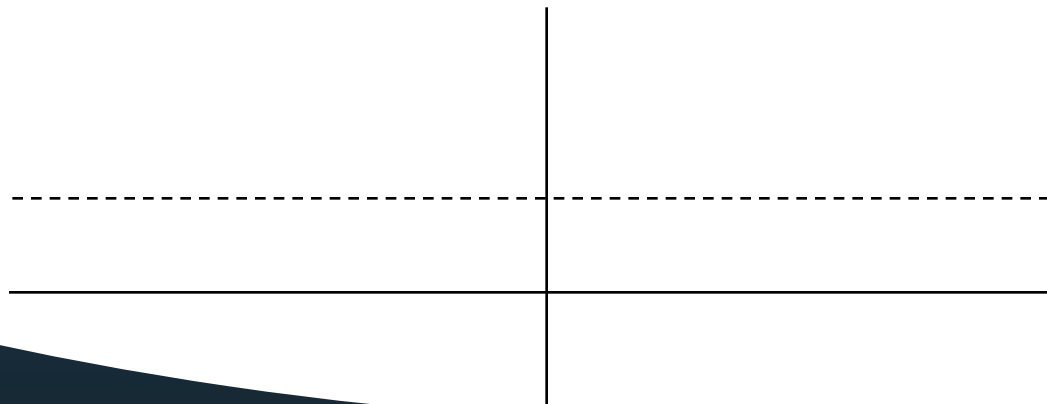


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On the Average You Will Break Even



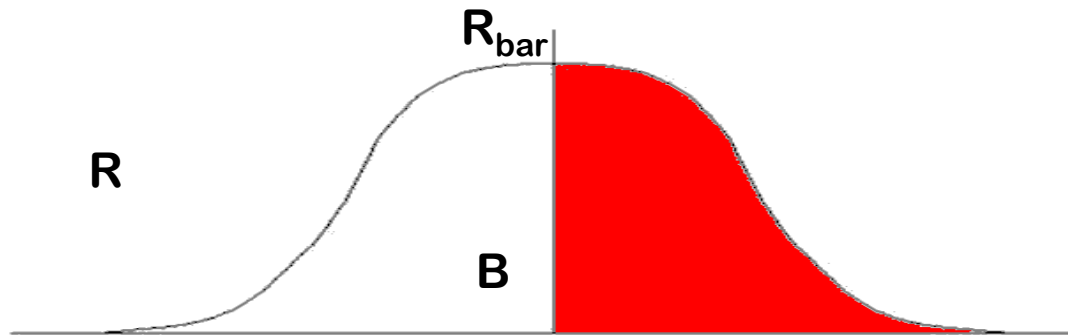
Assuming that the value of dollars or days to the left of B is the same for the units to the right.



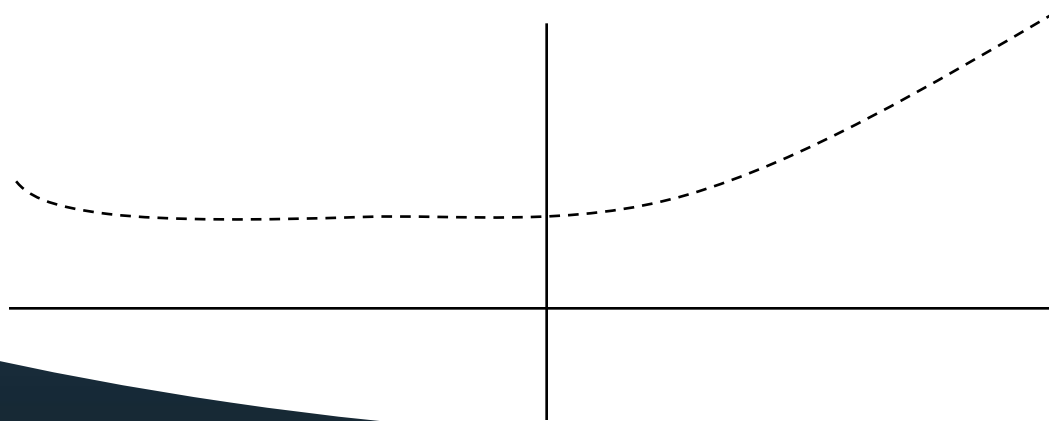


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But, the Assumption Does Not Often Hold



Dollars/days/units of estimate to the **RIGHT** of B can be much more expensive than units to the LEFT.



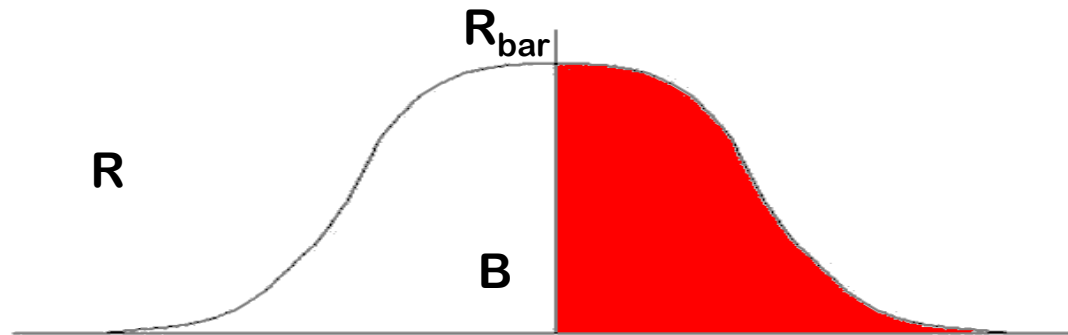


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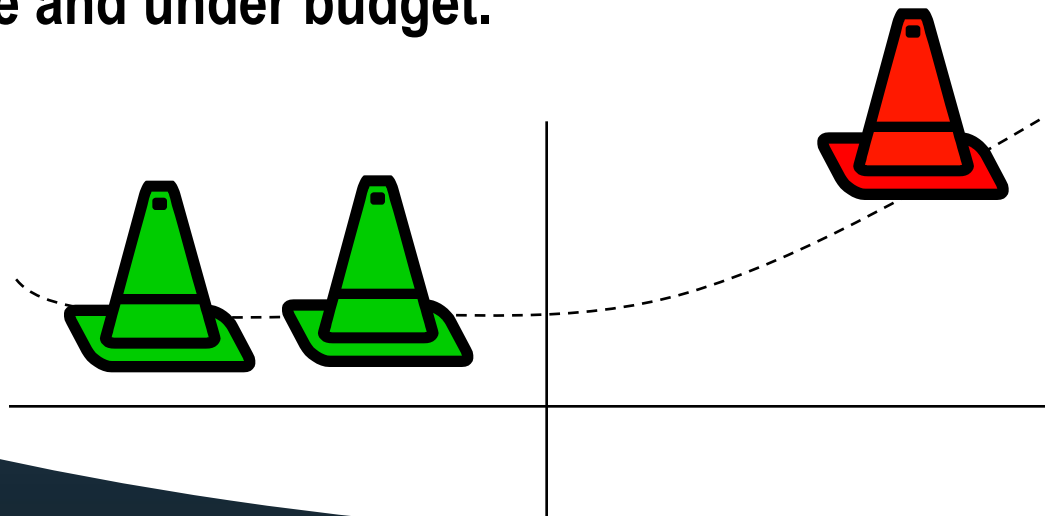
Rational Choices



Rational Choices - Analysis

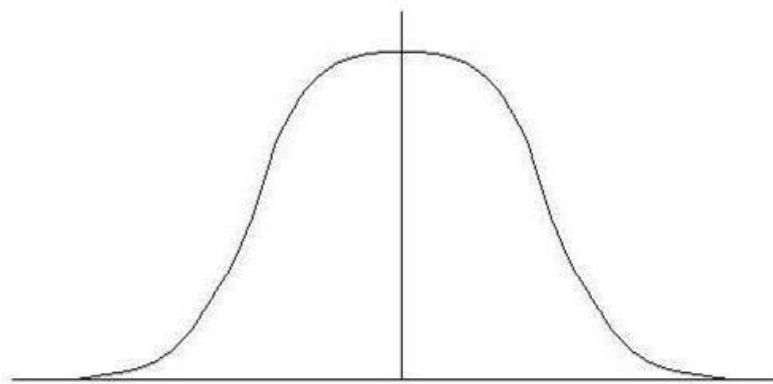


One project can be sacrificed so others can finish on time and under budget.



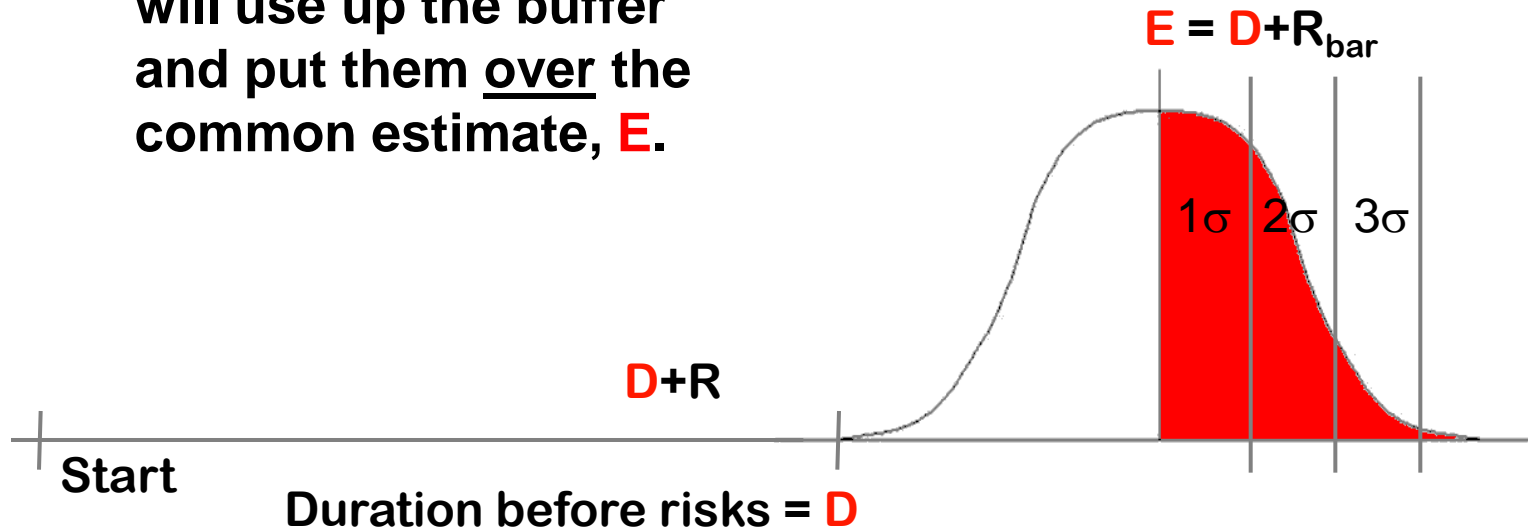
Central Limit Theorem to the Rescue

The Central Limit Theorem of statistics says that the **sums** of random variables tend to become approximately normal, i.e. they follow a Gaussian Curve.



How big should buffers be?

Applying the normal distribution to real projects with duration **D** means that half the projects will experience outcomes from manifested risks that will use up the buffer and put them over the common estimate, **E**.



We can estimate the standard deviation from the binomial nature of our risks:

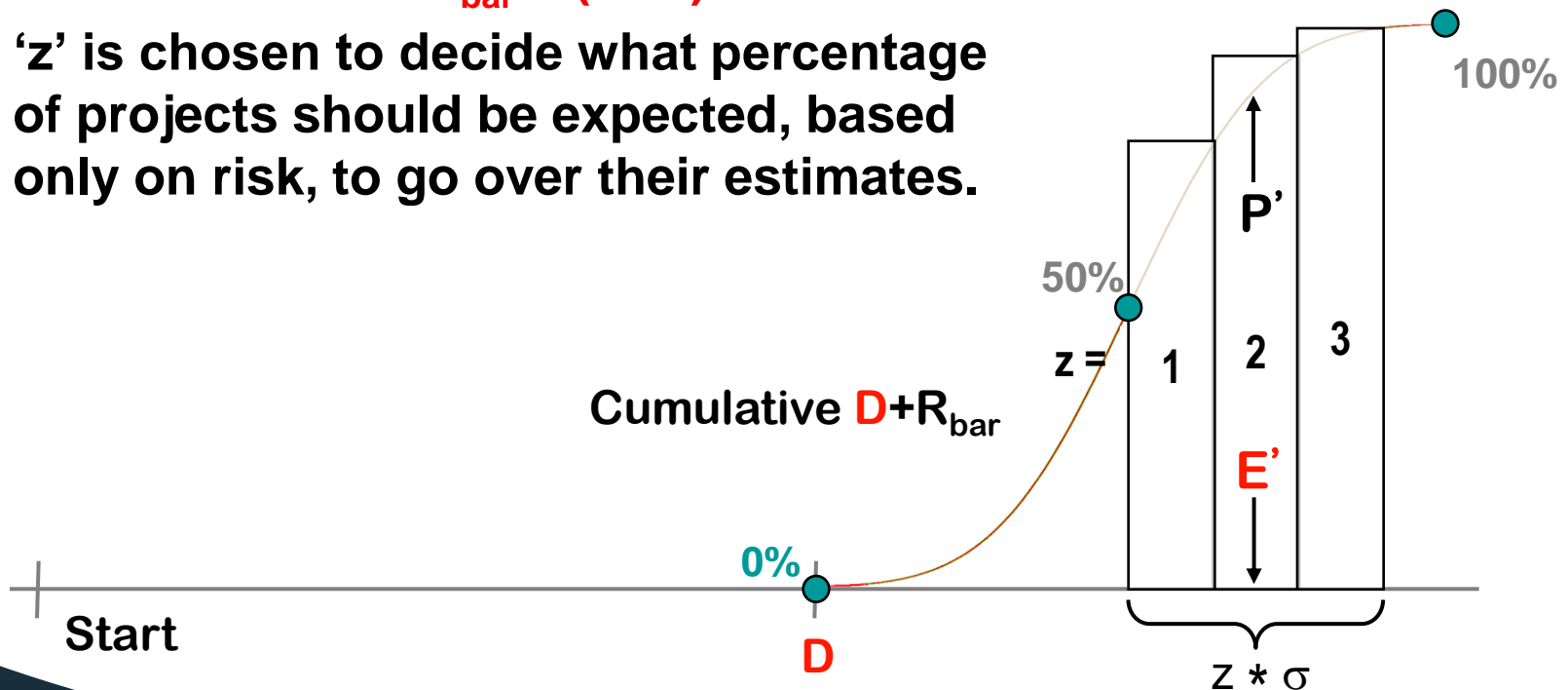
$$\sigma = \text{SQRT}[\text{SUM}(r_i^2 p_i (1 - p_i))]$$

Choosing the Buffer

And use our estimate to calculate a new buffer, B' , and new Estimate,

$$E' = D + B' = D + R_{\text{bar}} + (z * \sigma)$$

'z' is chosen to decide what percentage of projects should be expected, based only on risk, to go over their estimates.





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Choose your 'z'

Select a standard value for 'z' to use to calculate risk buffers.

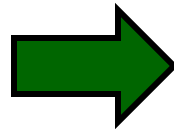
$$z = 0$$

will give you the protection you have now.

$$z = 2.0$$

will give you risk buffers to protect **97.72%** of projects (or phases of projects).

Only **2.28%** would be expected to exceed their buffer.

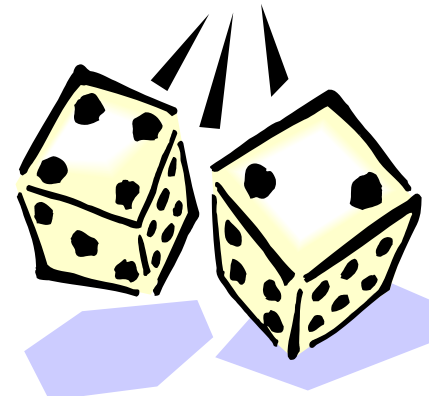


| z | % expected to be over |
|-----|-----------------------|
| 0.0 | 50.00% |
| 0.5 | 30.85% |
| 1.0 | 15.87% |
| 1.5 | 6.68% |
| 2.0 | 2.28% |
| 2.5 | 0.62% |
| 3.0 | 0.13% |
| 3.5 | 0.02% |

Exercise 2: Robust Buffer

| Number | Result |
|--------|---------|
| 1 | Success |
| 2 | Success |
| 3 | Success |
| 4 | Success |
| 5 | Success |
| 6 | Failure |

1. ROLL YOUR DIE!
2. Check the number that comes up.
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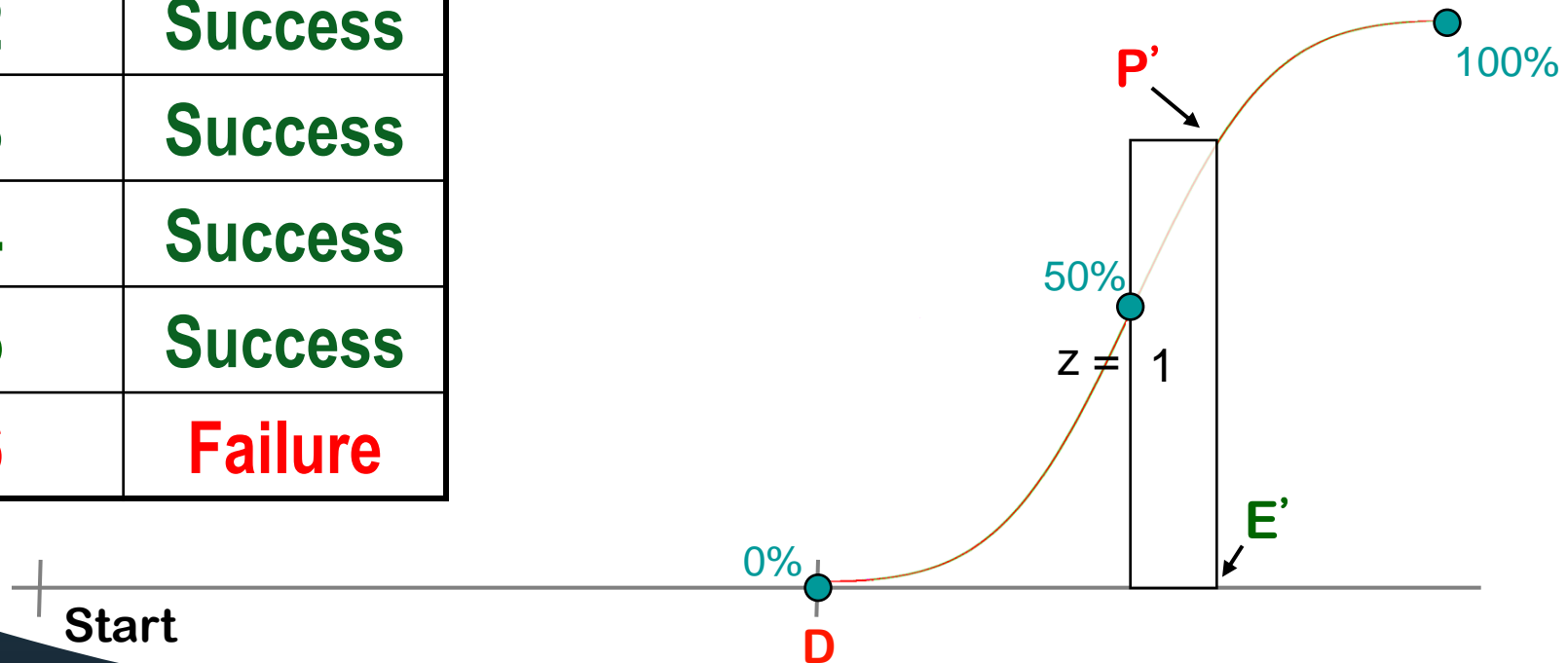
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Analysis of Exercise 2



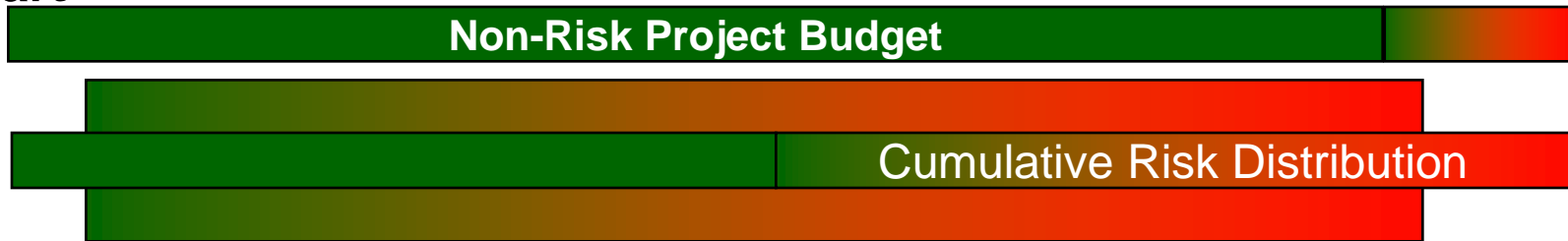
| Number | Result |
|--------|---------|
| 1 | Success |
| 2 | Success |
| 3 | Success |
| 4 | Success |
| 5 | Success |
| 6 | Failure |

Using $z = 1.0$ reduces risk related failure to almost a 16% chance. About 1 in 6.



Structuring Projects for Risk

Start



- Risk buffers are not typically a significant portion of a project's total budget.
- If they are, then this method becomes more important.
- If there is ONE major risk of high impact, you might consider making the buffer 100% of the impact.
- If the customer would not accept that, try making it a provisional project. And, construct sensitive triggers so the project can be abandoned at the first hint of the risk.



Using the New Buffers

The **ACTUAL** duration of projects will not increase.

The **ACTUAL** costs of projects will not increase.

Customers will not pay more or wait longer for projects.

Because...

Not all of risk buffers will be consumed! Some will. But, many won't.

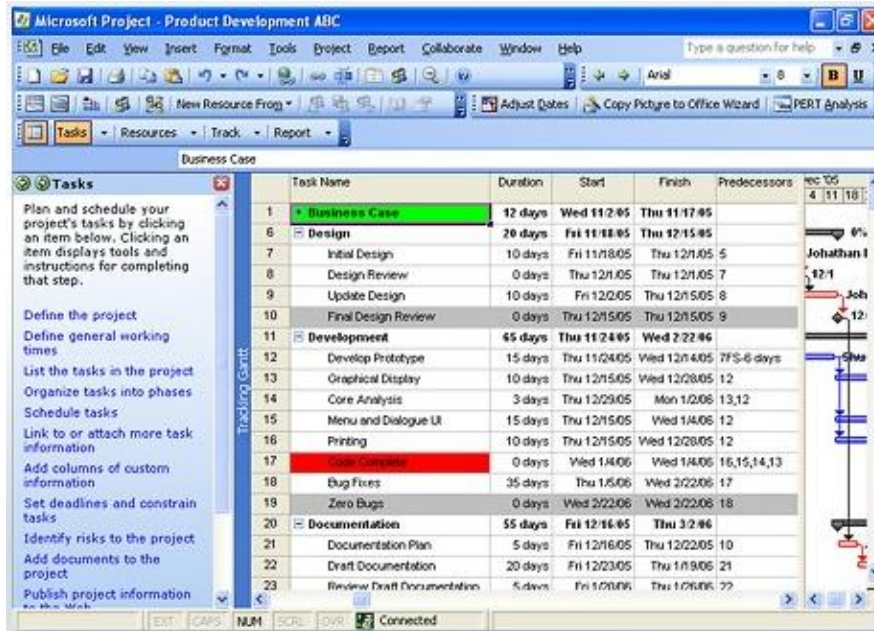
Customers will actually find that you are early and under-budget (or late and over-budget) according to the 'z' factor that you chose.

Benefits

- You will over-promise less.
- You will under-deliver less often.
- You won't have to charge more.
- You will just have to apologize less.

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Implementing Strategic Risk Management





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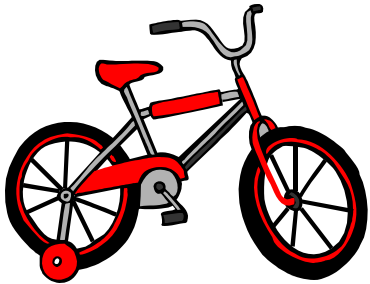
How Strategic Risk Management is Implemented

**PMBOK
4th Ed.**

1. Plan your strategy for risk management (11.1)
2. Identify risks (11.2)
3. Estimate risk impacts and likelihoods (11.3)
4. Calculate risk reserves/buffers (11.4)
5. Show risks and plans in the schedule (11.5)
6. **Accept only profitable projects**
7. Monitor and control risks (during execution) (11.6)
8. **Account for risks in schedule/budget**

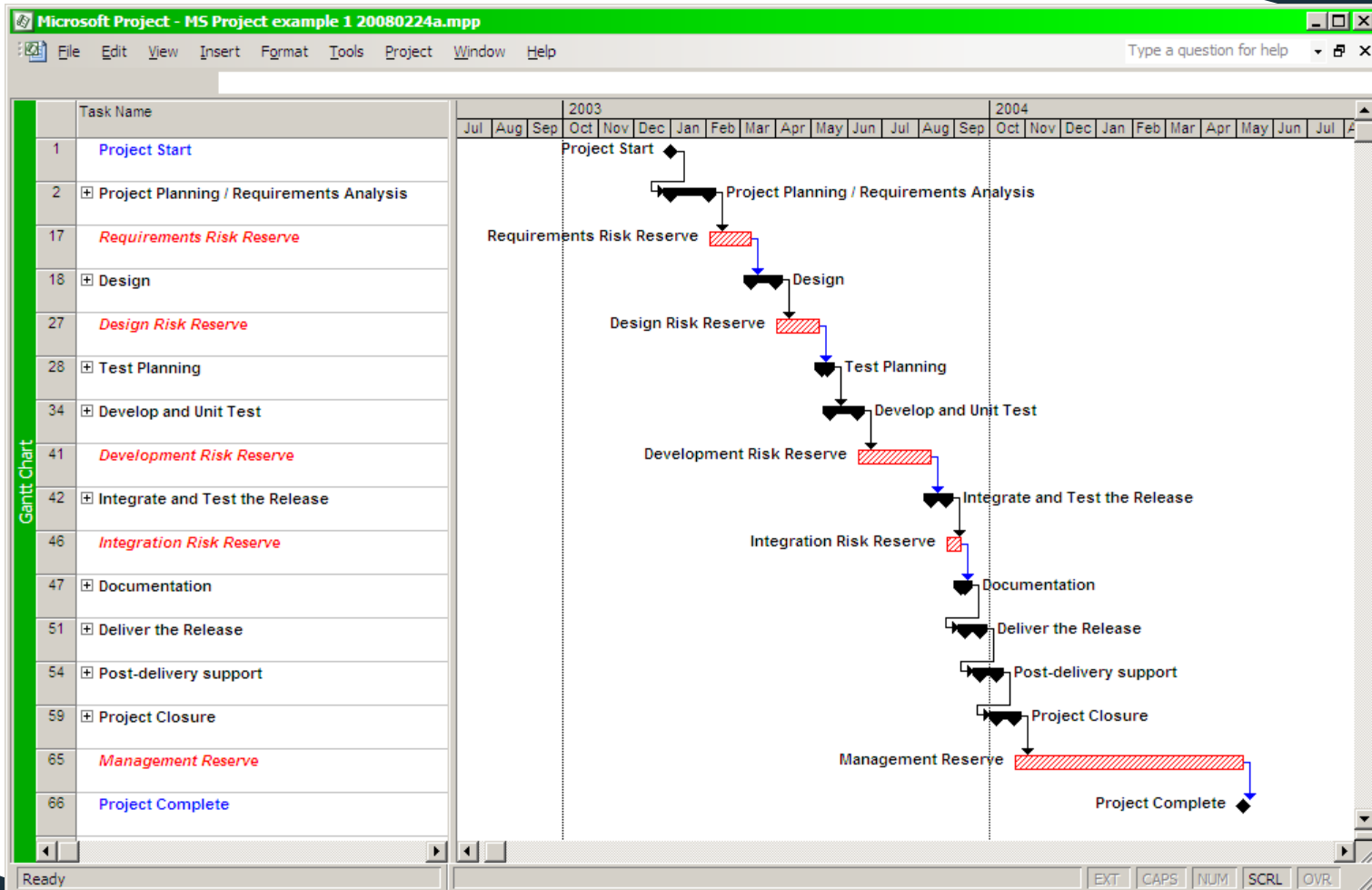
Identify Risks

- **“Waltzing with Bears”, identifies 5 risks common to software projects.**
 1. **Schedule flaw: overaggressive, clueless, etc**
 2. **Requirements inflation: a.k.a. scope creep**
 3. **Staff turnover: training, ramp-up costs, etc.**
 4. **Specification breakdown: hidden conflicts/flaws**
 5. **Underperformance: individual/group variance**
- **Use until your organization develops its own set of common risks, groups and categories.**



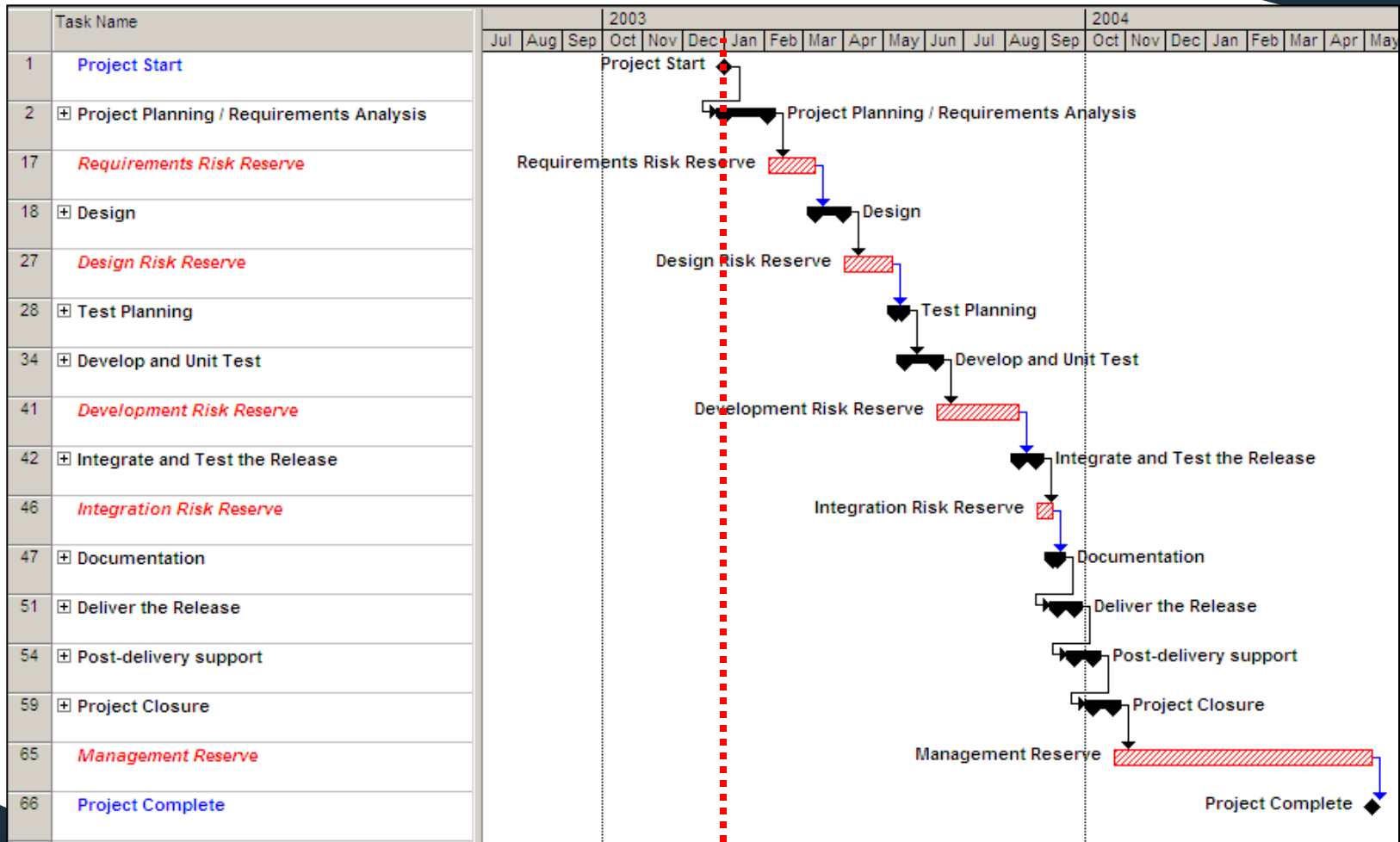
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Show Risks in the Schedule (1)

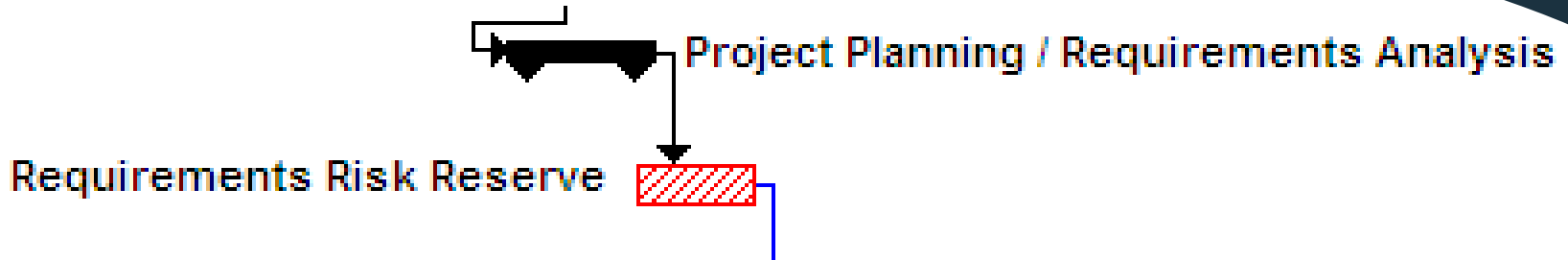


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Show Risks in the Schedule (2)



Show Risk Groups as Tasks



| # | RISK | \$(000) | DUR | HRS |
|---|--------------------------------------|---------|----------|-----|
| 1 | Missing reqs. will cause rework | \$100 | 10 weeks | 300 |
| 2 | Cust. will delay approval | | 3 weeks | |
| 3 | Inconsistent reqs. will cause rework | \$50 | 5 weeks | 150 |



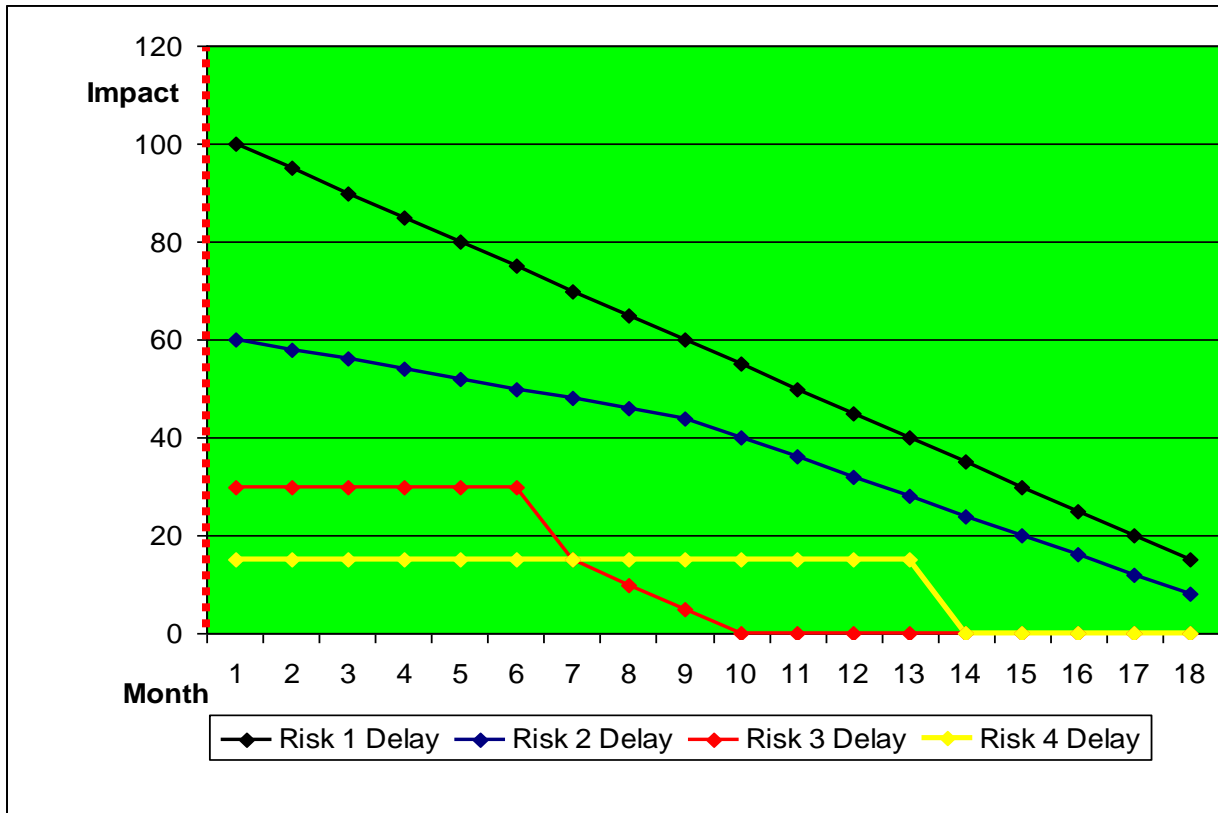
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Accept only profitable projects

| | UNPROFITABLE | PROFITABLE |
|--------------|--------------|-------------------|
| WIN THE BID | REJECT | ACCEPT |
| LOSE THE BID | WHEW! | OK, MORE TO LEARN |

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Monitor and Control Risks (1)



Over time the potential impact of risks will change.

So may the likelihood of risks change.

**THIS DIAGRAM CANNOT BECOME A PLAN.
UNCERTAINTY CANNOT BE PLANNED.**

Monitor and Control Risks (2)

Risks are tracked by regularly checking current impact and likelihood for changes. Have they already occurred and it is just not detected?

| | | |
|---------------------|---|-------------------------------|
| Far-Sighted Company | Project 7633: SSN Suppression on checks and EFT Weekly Status Meeting Agenda | Document# n/a Version# n/a |
|---------------------|---|-------------------------------|

3. All risks

| | | | | | |
|--|---------------|--------------|------------------------|--------|---------------------|
| 33: RISK: flash forms change for salaried coupons: conflict with "monthly" having higher priority. | Type: Risk | Impact: 3 | Status: In Progress | Owner: | Created: 5/12/04 |
|--|---------------|--------------|------------------------|--------|---------------------|

| | | | | | |
|---|---------------|--------------|-----------------|--------|---------------------|
| 43: Potential conflict with other projects implementing the week of July 5. | Type: Risk | Impact: 3 | Status: Open | Owner: | Created: 5/25/04 |
|---|---------------|--------------|-----------------|--------|---------------------|

| | | | | | |
|--|---------------|--------------|-----------------|--------|---------------------|
| 51: RISK: Space problem adding EID to TKS CHRON master file. | Type: Risk | Impact: 3 | Status: Open | Owner: | Created: 5/25/04 |
|--|---------------|--------------|-----------------|--------|---------------------|

Description: There may not be enough filler or some other place to put EID. Can proceed with mini-proposal under assumption that space will be found to complete Definition under current requirements.

| | | | | | |
|---|---------------|--------------|-----------------|--------|---------------------|
| 53: RISK: Customer personnel may not be available as we need them to review Pilot implementation results July 5-16. | Type: Risk | Impact: 3 | Status: Open | Owner: | Created: 5/26/04 |
|---|---------------|--------------|-----------------|--------|---------------------|

| | | | | | |
|--|---------------|--------------|-----------------|--------|---------------------|
| 55: RISK: Banking field information not in project documents: RQ, TDD, UTP, UATP | Type: Risk | Impact: 3 | Status: Open | Owner: | Created: 5/26/04 |
|--|---------------|--------------|-----------------|--------|---------------------|

| | | | | | |
|--|---------------|--------------|-----------------|--------|---------------------|
| 36: RISK: "laser extract" file goes to "WorkSpace". (PSEYSSRC) | Type: Risk | Impact: 5 | Status: Open | Owner: | Created: 5/12/04 |
|--|---------------|--------------|-----------------|--------|---------------------|

Monitor and Control Risks (3)

- Check on identified risks in & out of meetings
- Close risks manifested or that can't happen any more
- Update likelihood and impact ratings and costs
- Identify new risks
- Recalculate risk reserves
- Update reserves in the schedule/budget

YES, that might mean *GIVING BACK* some, or all, of a reserve.



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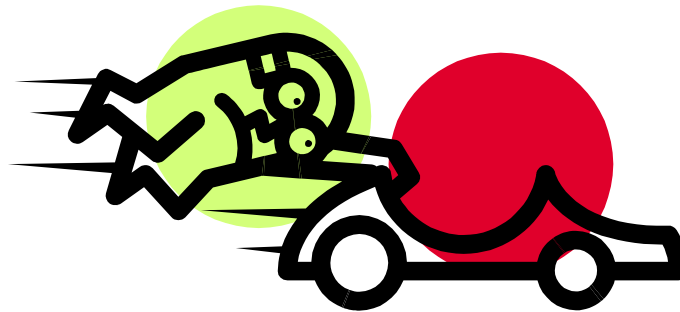
Accounting for Risks

| Activity | Actuals Allocation |
|------------------------------|---------------------------------|
| Mitigation planning | Planning |
| Contingency planning | Planning |
| Mitigation execution | Mitigation tasks planned |
| Contingency execution | Risk reserve 'task' |
| New risk response | Management reserve |



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Going Forward



Summary: Improving Practices

- **Implement PMBOK risk management practices.**
 - Calculate risk buffers to reflect the level of confidence required.
 - Insert risk buffers into the budgets and schedules.
- **Accept only profitable projects**
- **Monitor risks by including their discussion in regular meetings.**
 - Reflect changed probabilities and impacts in the budget and schedule.
- **Save data as strategic asset. [Learn more.](#)**



Questions



PDU information for PMPs:

**Enter 1 hour in Category 'B'
with today's date and
'Risk Management as the topic**



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References/Reading

Grant, E. L., and R. S. Leavenworth: “Statistical Quality Control”, McGraw-Hill Book Company, New York, 1980.

DeMarco, T., and T. Lister: “Waltzing with Bears”, Dorset House Publishing, New York, 2003.

Galorath, D., and M. Evans: “Software Sizing, Estimation, and Risk Management”, Auerbach Publications, Boca Raton, 2008.

Project Management Institute: “PMBOK Guide”, 4th Edition, PMI Publications, Newton Square, Pennsylvania, 2008.



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