Risk Management Best Practices for Small Projects

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Abstract

Risk management is the process of evaluating why your project might fail or get off plan at some point in the future, and planning to prevent those excursions before they take place. Risk approaches have been developed by the PMI, DoD and NASA. All are similar, with some nuanced differences. Small projects can often effectively use a tailored approach involving risk identification, response planning and response implementation. Risks should be identified as something that might happen in the future that will impact a project objective, usually scope, schedule or budget. A good risk statement should be written in the "If… then…" format, with the "if" statement identifying the event that might happen, and the "then" statement identifying the impact to the project. The likelihood of the "if" event happening can then be evaluated on a percentage basis, and the "then" impact to the project can be evaluated using project metrics, typically scope changes, budget impact or cost impact. Response plans are then developed to reduce the probability of the risk happening and to mitigate the impact to the project if the risk does come to pass. All the information about the risk is then captured in the risk register for monitoring, controlling and reporting. A risk register template for small projects is presented.

Introduction

Risk management is usually presented as a complicated practice to the risk management novice. There are several sequential steps that appear to make risk management a difficult and tedious process. Considering also that few people understand the nature and value of risk management, and it is easy to see why most project managers see the risk management process as a difficult and tedious with little value added. They think of it as "checking a box" in the project management process rather than a valuable exercise that makes a significant contribution to project success. Little could be further from the truth. Managing project risk can be the difference between success and failure, between finishing on time and on budget, or late and over budget. This paper clarifies the value of project risk management and tailors the confusing PMBOK process to an easy process for small projects to follow.

The Value of Project Risk Management

Risk management is simply the process of thinking about the future of your project and asking, "at some point in the future, why might we have failed? Why will we be over budget, behind schedule, or having technical or quality issues?" This isn't just checking a box; this is a good exercise to conduct.

In addition to identifying risks, a good project manager creates and implements risk response plans. Those plans can minimize the likelihood of those risks occurring so that they are less likely to happen, or don't happen at all, or the plan can ensure that if the risk does come to pass it can have less of an impact on the project, or no impact at all. These risk response plans are captured in the project plan so that risk management doesn't become a one-time thought exercise that never gets acted on. The response plans

are placed in the action list and assigned to individuals, schedules are updated with actions and watch-list milestones, the budget is updated to reflect the resources required to act on the risk, and in some cases the WBS is even modified to account for the risk response strategy.

By identifying risks and developing response plans, and incorporating those response plans into the project plan, the probability of project success can be increased significantly. In fact, the Project Management Institute considers risk management so important that they have specifically created a "Practice Standard for Project Risk Management" (2009), a stand-alone book dedicated solely to this subject.

Approaches to Risk Management

There are three main approaches to risk management used by project managers in small project communities, those published by the Project Management Institute (PMI) (2008), the Department of Defense (DoD) (2012) and the National Aeronautics and Space Administration (NASA) (2011). The process published by PMI is by far the most familiar, but all three of the processes are very similar.

The PMI lists six processes for risk management in its PMBOK Chapter 11 (2011, 273). They are identified by chapter section:

11.1 Plan Risk Management

11.2 Identify Risks

11.3 Perform Qualitative Risk Analysis

11.4 Perform Quantitative Risk Analysis

11.5 Plan Risk Responses

11.6 Monitor and Control Risks

The DoD has published its own "Risk Management Guide for DoD Acquisition," a 20-page booklet outlining their risk management practices. Although similar to the PMI process, it is somewhat more intuitive and easier to follow. The DoD process model consists of (2011, 4):

- Risk Identification
- Risk Analysis
- Risk Mitigation Planning
- Risk Mitigation Plan Implementation, and
- Risk Tracking

NASA has published its own risk management process manual. This 256-page manual is highly tailored and detailed to reflect NASA's unique manned spaceflight mission and experiences, including the loss of life in the Apollo 1 fire and the Challenger and Columbia disasters. The set of processes in what they call "Continuous Risk Management (CRM)," however, is quite similar to the PMI and DoD processes. They are (2011, 15):

- Identify
- Analyze
- Plan
- Track
- Control

A comparison of the three sets of processes reveals remarkable similarity. It also reveals a fairly common sense approach to risk management wherein the project manager essentially follows three processes:

- Identify risks
- Plan responses to control those risks
- Implement the risk response and control plans

Behind this simplicity, the confusion lies in executing what ought to be a straightforward process. The DoD handbook is only 20 pages long, but the PMI risk management practice standard is a book 116 pages long and the NASA handbook is 256 pages long. No wonder risk management appears to be a wizard's mysterious tool that most project managers never take the time to master! In large projects, especially government contracting projects, teams of experts who understand these processes are dedicated to risk management. In the small business and small contract environments, however, such teams are prohibitively expensive. It is for those projects that the remainder of this paper is written, providing the small project manager with an effective risk management tool to significantly enhance your likelihood of project success.

Recommended Best Practice for Risk Management on Small Projects

As mentioned above, there are three key steps to effective risk management:

- Identify risks
- Plan responses to control those risks
- Implement the risk response and control plans

Identify Risks

Before outlining the best practice for these steps, it is important to understand exactly what a risk is. Only then is it possible to properly identify and plan for risks. A risk is something that might happen in the future and impact the outcome of your project. If it is something that is sure to happen, or that already has happened, it is not a risk, it's

an issue. Issues are easy to recognize and are always being worked on by project teams. It's called "putting out fires" in most project management circles. Good risk management anticipates issues so that when they occur there are plans already in place to handle them and the project team spends less time fighting fires and more time executing the project plan.

Since a risk is something that *might* happen in the future and *impact* the outcome of the project, we describe the risk and the effectiveness of the response plan by these two factors, the **probability** that the risk might happen and it's **impact** on the project if it does. With this in mind, it is critically important to identify risks by writing risk statements with this format.

Writing a Risk Statement

Although there are various recommendations in the three above-referenced risk manuals about how to write a good risk statement, the easiest way to write a good risk statement is to use the "If…then…" format. For example, "If the weather is bad then the key technology demonstration event may be delayed." This tells the reader what it is that might happen and what the impact on the project is. In this case weather events are understood on seasonal cycles so the probability of the event is fairly well understood, and it is clear that this will have a schedule impact. This enables the team to implement a schedule risk mitigation strategy that might involve scheduling the demonstration for a particular time of year, or for a window of days instead of a single day, or a combination of the two. If the risk were simply written, "Weather," as many risks are, different people would have different ideas of what the risk really means, the project team would operate in confusion, and the risk response plan might not be adequate for the true risk. This lack

of specificity and definition is a very common cause of poor and ineffective risk management. The source and impact of the risk must be identified for effective risk responses to be developed.

Another risk might relate to a key supplier who has been having quality problems with a key technology component of your product. The risk statement might read, "If XY corporation delivers Z component with poor quality control then our deliverable will become unacceptable to the customer." This enables the project team to begin developing risk responses that might include developing an alternate supplier of the key technology component, or performing on-site quality control at XY corporation to ensure that substandard products are not delivered, or both. If the risk were written poorly, along the lines of "Quality control," (again, this is more common that we like to believe) the team might never adequately address the intended risk.

Identify Risk Probability and Impact

Many project managers use a "gut feel" to identifying the probability of a risk taking place and the impact it will have on a project. Regarding the weather risk mentioned above, they might say, with no justification, that the probability is low so they assign it 1 on a scale of 5, and that the impact is only a couple of days so they assign it 1 on a scale of 5. While this is better than no risk management at all, it is only just better than nothing at all. The risk management plan needs to clearly identify a probability and impact scale.

The probability of occurrence is largely project-dependent and should be adjusted to the risk tolerance of the stakeholders. But I have found the following probability scale in Figure 1 quite common and a useful general scale for small projects.

Probability

Level	Probability of Occurence
5	61% - 99%
4	41% - 60%
3	21% - 40%
2	11% - 20%
1	1 - 10%

Figure 1. Probability scale for risk occurrence.

For the weather example above a review of weather history data for the demonstration location on the same time of day for the day of the year might reveal an aggregate probability of bad weather of 30%. So this risk would be assigned a probability level of 3. For the quality risk above, it might be seen that 50% of the time their products are delivered with defects and that risk probability would be rated a 4.

The impact of a risk must be judged against project metrics, and hence the classification is not quite a s simple. In general, the three areas of a project plan that might be affected by a risk are, technical (scope), schedule and budget. Quality is often added as well, but for the small project it is easy to combine this with the technical category. Figure 2 shows a collection of scope, schedule and impact definitions rated on a scale of 1-5. Notice that this table does not use absolution numbers, like $40,000 or 3 months impact. This is because every project has it's own budget and schedule scales that make absolute statements like "schedule impact less than 2 weeks is negligible." It's quite possible that a 2-week impact might cause a company to lose a contract. So these

impact assessments are made on a percentage basis and the project manager can evaluate each project risk within the context of that particular project. You should always discuss these classification rankings with your customer during the project planning phase and adjust them as needed. Some customers are more or less sensitive to some risk categories and they will need to be tightened or loosened accordingly.

Also note that most risks do not affect only one area of the project. Any schedule impact will also have a budget impact, and so forth. The best option for the project manager is to pick the impact that is most obvious and severe and assign that to the risk and track the risk accordingly. Assigning multiple impact areas to a risk is unnecessary and only complicates the process. If the risk is properly addressed all affected areas will be resolved whether they are being tracked or not.

Cost	Budget or unit cost production increase <1% of budget	Budget or unit cost production increase 1%-2% of budget	Budget or unit cost production increase 3%-10% of budget	Budget or unit cost production increase 11%-20% of budget	Budget or unit cost production increase >20% of budget
Schedule	Schedule Impact <1%	Schedule impact 1% - 5%	Schedule impact 5% - 10%	Schedule impact 10% - 20%	Schedule impact >20%
Technical	Scope decrease barely noticeable	Minor affect on scope	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is useless
Level	1	2	3	4	5

Impact

Figure 2. Risk impact scale for small projects.

Relating this table to the examples above, first consider the weather risk. If the schedule delay is likely to be a week for logistics reasons, and the demonstration is five

months away (~100 working days), the schedule impact would be 5%. Since this is on the boundary between a 2 and a 3, and I know my customer is particularly sensitive to schedule changes, you would assign this an impact level of 3. The weather risk is now rated with a probability of 3 and a impact of 3.

The quality risk is stated, "If XY corporation delivers Z component with poor quality control then our deliverable will become unacceptable to the customer." The consequence is that our deliverable might not perform to the customer's satisfaction. By the definition in Figure 2, "unacceptable to the customer" is classified as a level 4 technical risk. So this risk has a probability of 4 and an impact of 4.

Collect a "Risk Register"

Now that you have properly written a clear risk statement and identified the probability and impact of your risks, collect that information in one place for easy planning, tracking and reporting. This is conveniently done using the format in Figure 3. Simply create a PowerPoint slide in the format of Figure 3 for each risk and the file with the collection of slides becomes your "Risk Register" database for the project.

The first page of the risk register should be a snapshot of all the risks and their position on the stoplight chart. A template for this summary sheet is shown in Figure 4. This provides a snapshot of the number and severity of all risks being tracked in a project. With this title slide followed by a slide for each risk you have a simple but complete and effective risk register for a small project or small business without consuming a disproportionately large amount of resources.

Risk Title

Risk ID#	
Risk Owner	
Date Submitted	
Date Last Updated	

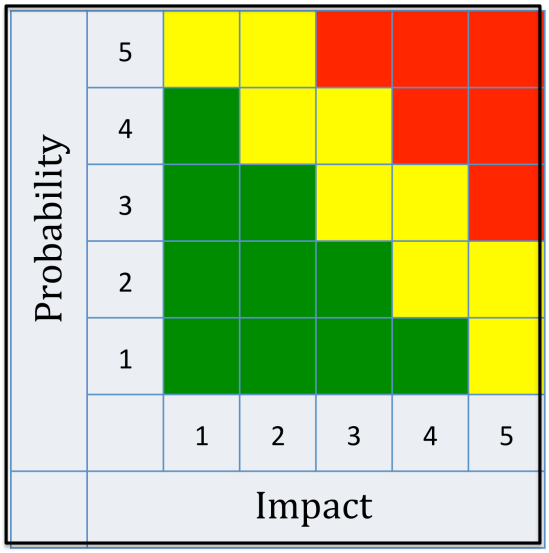
Risk Statement

If

Then

Probability Justification

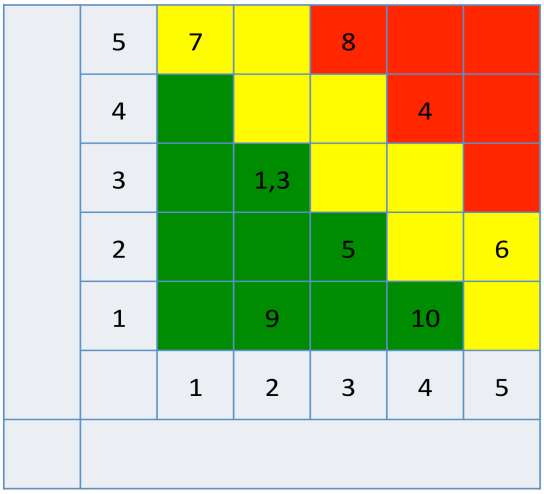
Impact Justification (Category: Cost/Schedule/Budget)



Risk Response Plans and Status	
Risk Response Plan 1 (Probability Reduction)	Status
Risk Response Plan 2 (Impact Reduction)	Status

Figure 3: Risk register database template.

Project X Risk Register Summary



Risk List	
Risk ID#	Risk Statement
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Figure 4. Risk register summary sheet

Tips on Identifying Risk

Since the impact of a risk must relate to a project objective, and we have clearly identified those objectives as technical (scope), schedule and budget, the first step in identifying risk is to review the project plan scope statement, WBS, schedule and budget and ask yourself and the owners of those portions of the project "what can go wrong?" This is also a good opportunity to get input from team members. There are always team members willing to say "I told you so" when something goes wrong later on in a project. Approach these people up front early in the project and tell them to "tell you so" now (or forever hold their tongue!). Also get customer input. There is often one or more concerns of a customer that should be tracked as risks. Finally, there are checklists galore available on the Internet that can give you ideas for project pitfalls you just haven't thought about.

Plan Responses to Control Risks

There are four approaches to controlling risk:

1. Avoid a risk
2. Transfer a risk
3. Mitigate the risk
4. Accept the risk

These approaches are best understood using the analogy of a hurricane risk to building a house on the New Orleans coast. To avoid the risk means to change the plan so that the risk disappears. To avoid a hurricane risk on the New Orleans coast you might decide to build the house in St. Louis. This avoids the hurricane risk. Transferring a risk

means letting someone else bear the impact of the risk. In the case of building a house you would buy insurance so that if the house is destroyed the risk is taken by the insurance company who must pay to rebuild, not you. To mitigate the risk you might build a stronger house out of stone or brick or concrete, or a very high, sturdy wall to shield the house from wind and debris. You have mitigated the risk by attempting to reduce the impact of the hurricane should it hit. Finally, you can just accept the risk, build a standard house, and hope for the best. All these processes apply to project risk management, with insurance and mitigation being the most common. In the case of the hurricane risk to the demonstration used previously in this paper, mitigation might include scheduling the demonstration for a week instead of a day so that if the weather forces a delay the schedule is not affected. This mitigates the impact of the risk should it occur. The demonstration might also be scheduled for a month with historically good weather to further the probability of occurrence. In this way you have performed risk mitigation by reducing both the probability and impact of the risk.

Regarding the quality risk, there are two obvious mitigation strategies, perform quality control at the supplier' site and find an alternate supplier. Both of these approaches reduce the probability of the supplier delivering poor quality products, but neither reduces the impact if defective items are delivered. In order to reduce the impact we might order the parts very early in the project so they can be reworked if necessary, order excess parts so that a defective margin is allowed (with return guarantees, of course) or redesign the product to remove the risky design and incorporate more reliable subsystems. So the project manager would explore all these options and find that the supplier owns the patent for the part, eliminating alternative suppliers, but is willing to let

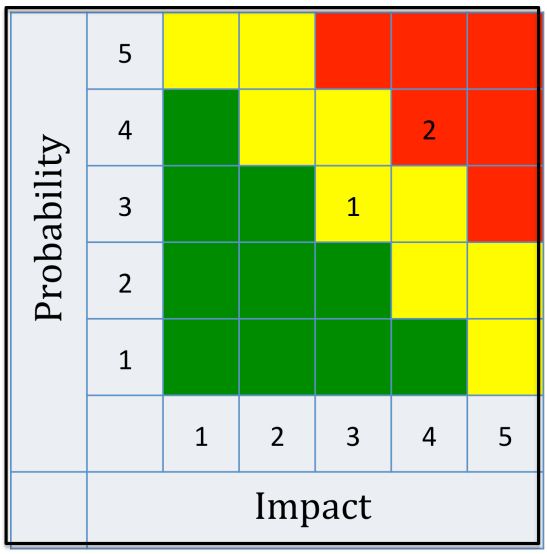
you perform quality control for him. The supplier is also willing to provide the parts with a lead-time and provide rework if necessary at your facility. So these two risk mitigation approaches would be chosen.

In summary, the key to developing risk response plans is to consider how you can *reduce both the probability and the impact of a risk*. Be creative. The risk register data sheet template for individual risks is written to remind you to consider two plans, one for reducing probability and one for reducing impact. Sometimes you can only address one, probability or impact, not both. That's acceptable, as long as you have given some thought to each aspect of the risk. Sometimes you can come up with more than one plan for either or both probability and impact. Adjust the template as necessary.

The Complete Risk Register

At this point the risk statements have been written, each risk evaluated for probability and impact, and two mitigation plans have been developed for each to address both probability and impact. The complete, initial risk register containing all this information is shown in Figures 5, 6, 7 & 8.

Project X Risk Register Summary
March 1, 2010



Risk List	
Risk ID#	Risk Statement
1	If the weather is bad then the key technology demonstration event may be delayed.
2	If XY corporation delivers Z component with poor quality control then our deliverable will become unacceptable to the customer.

Figure 5. Risk register summary page.

Probability/Impact Definitions

Level	Probability of Occurence
5	61% - 99%
4	41% - 60%
3	21% - 40%
2	11% - 20%
1	1 - 10%

Cost	Budget or unit cost production increase <1% of budget	Budget or unit cost production increase 1%-2% of budget	Budget or unit cost production increase 3%-10% of budget	Budget or unit cost production increase 11%-20% of budget	Budget or unit cost production increase >20% of budget
Schedule	Schedule Impact <1%	Schedule impact 1% - 5%	Schedule impact 5% - 10%	Schedule impact 10% - 20%	Schedule impact >20%
Technical	Scope decrease barely noticeable	Minor affect on scope	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is useless
Level	1	2	3	4	5

Probability

Impact

Figure 6. Risk register probability and impact definitions.

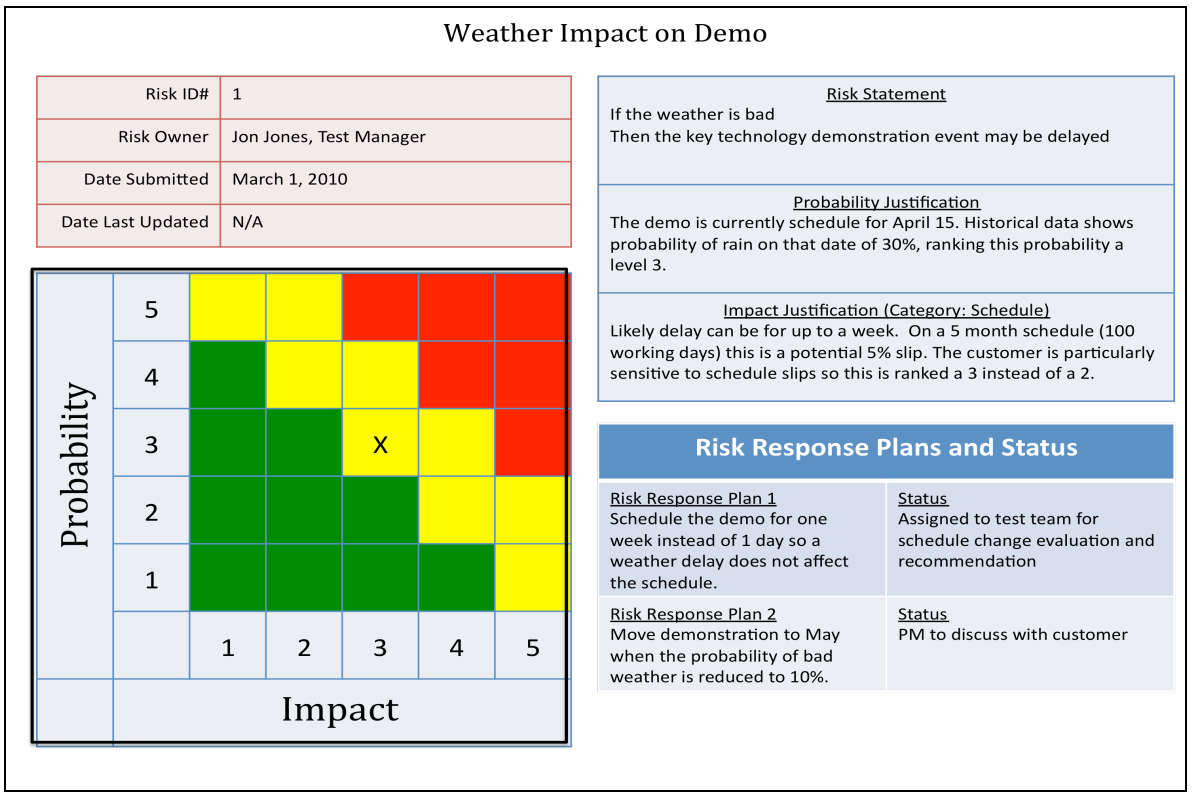


Figure 7. Risk register sheet for "weather" risk.

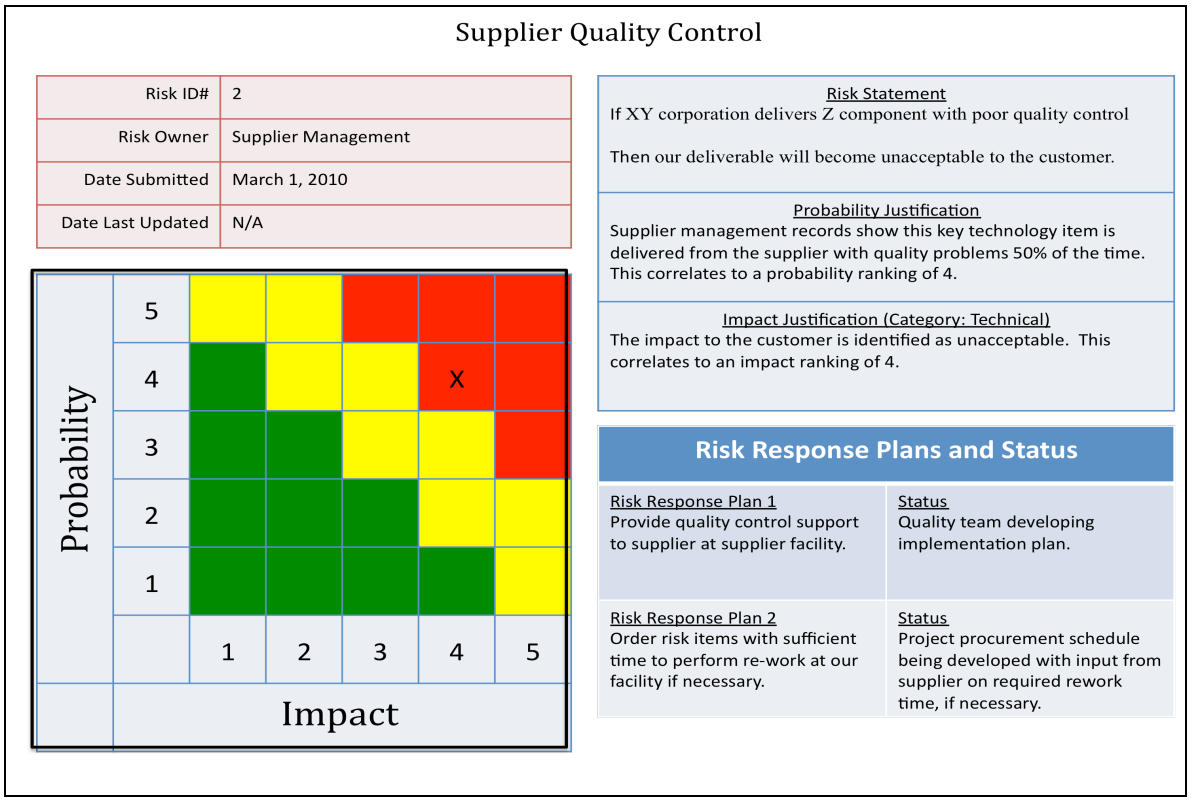


Figure 8. Risk register sheet for "quality" risk.

Implement the Risk Response and Control Plans

With a good plan in place, implementation and control is straightforward. The general rule of thumb for risk management is:

1. Monitor "green" risks
2. Work risk response plans for yellow risks
3. Work risk response plans and provide regular reporting (weekly) to the customer for "red" risks.

The key to effective risk control is to make sure the response plan is incorporated into the project plan, including the schedule, the budget and the scope/WBS wherever necessary. Let's use as examples the four risk response plans in Figures 7 and 8.

- Schedule the demo for one week instead of 1 day so a weather delay does not affect the schedule: This may involve all of the following: reserving the test range for one week instead of one day, impacting work schedules of team members on loan for the demo, increasing the budget for the event, shortening the preparation schedule or delaying the schedule events coming after the demo (after all the extra four days have to come from somewhere!). The budget and schedule should be updated to capture all of this.
- Move demonstration to May when the probability of bad weather is reduced to 10%: The same considerations need to be given here as to the previous example, with the addition of coordinating this with the customer to make sure a one-month slip is acceptable.

- Provide quality control support to supplier at supplier facility. This will have staffing impact (availability of quality team members to work at supplier site, which may be geographically distant) and a cost impact for labor and perhaps travel. Capture all this in updated HR and budget plans.
- Order risk items with sufficient time to perform re-work at our facility if necessary. The budget needs to provide funding for earlier procurement than might have previously been considered, and floor space and staffing will be required to support supplier rework activities. All of this must be coordinated with responsible parties and written into the project plan.

After the risk response plans have been implemented it is crucial to continue reporting progress to the customer. This involves two steps (in addition to the actual reporting:

1. Update all the slides before the customer briefing
2. Reorder the slides so that all risks that were "red" for the previous briefing are first (even if they have been changed to yellow or green). This allows the risks the customer believes are red to be briefed and the remainder of the risks to be kept as back-up in case the customer has additional questions.

The original risk register, shown in Figures 5-8, was created on March 1, 2010. The risk register for the March 8 briefing would appear as shown in Figures 9-11. Note that the probability and impact definitions sheet has been left out of this paper for brevity. I should be included in the briefing to support any discussions about justifying the change in impact and probability based on the response plans.

It is important to note that in the case of the quality risk, the nature of the impact has changed from a technical risk to a cost risk. Because the risk response plan allows sufficient time to rework defective components received from the supplier, the probability of defective equipment being delivered to the customer is practically eliminated. But this will come at a cost. If the risk is realized and the supplier provides defective components to the project team, the project team must support the rework to eliminate all quality defects. This will tie up project resources in the form of floor space and personnel, and this impact now becomes large than the technical impact, which is essentially eliminated, and the schedule impact since the schedule has been adjusted to account for the rework if necessary.

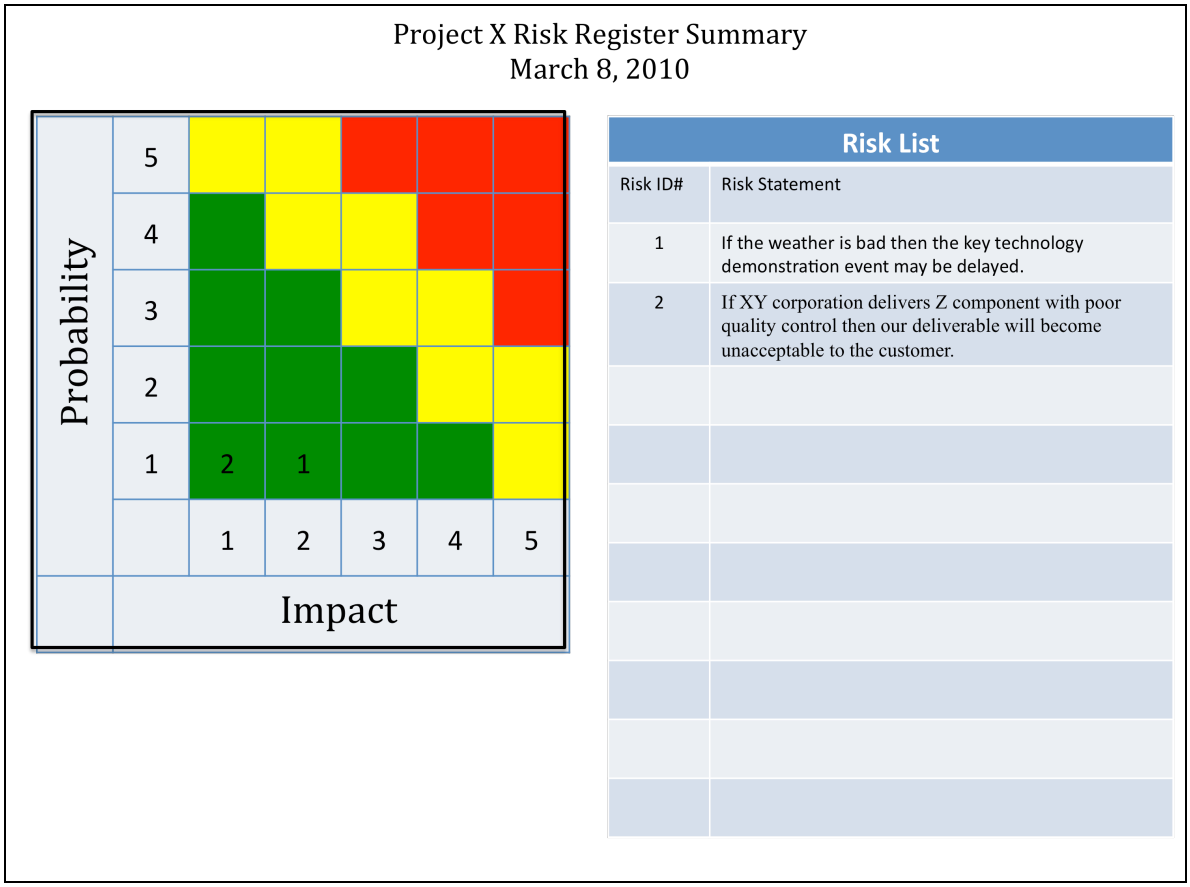


Figure 9. Risk register summary page updated for weekly report with risks shown moved lower left to reflect progress of risk response plan.

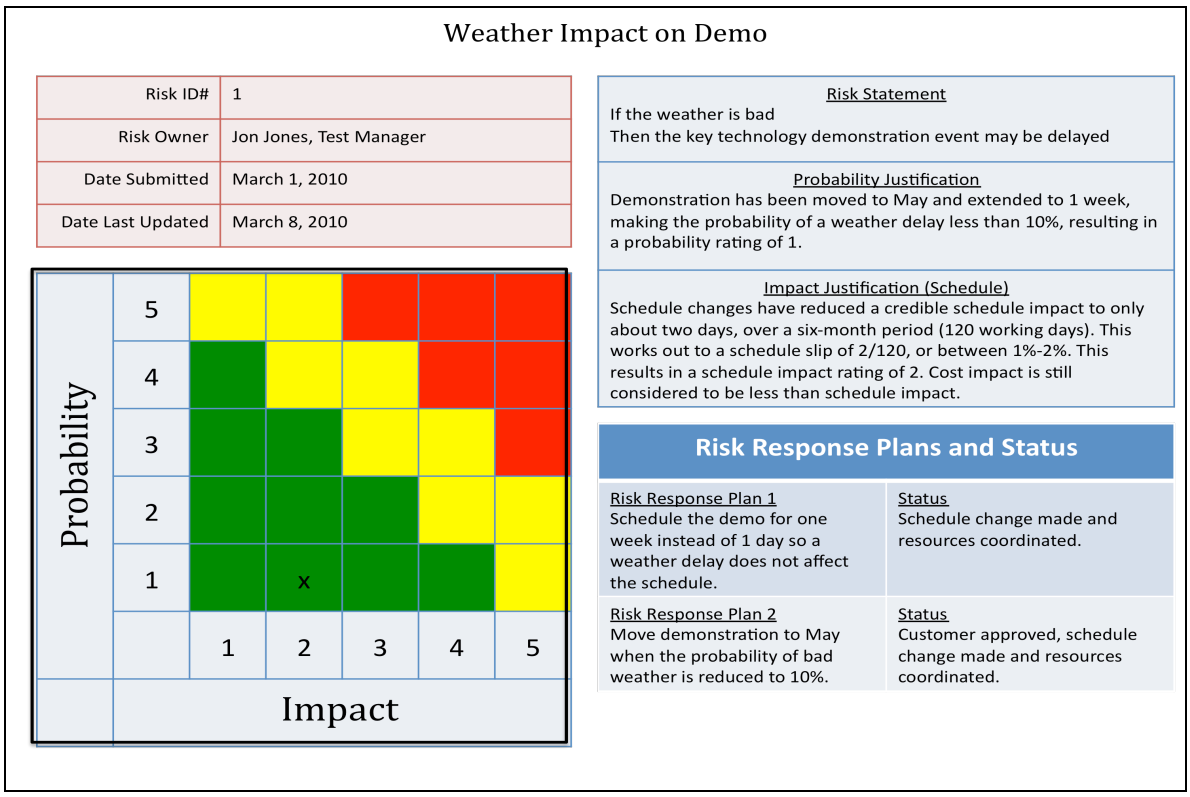


Figure 10: "Weather" risk register sheet with updates to reflect risk response progress.

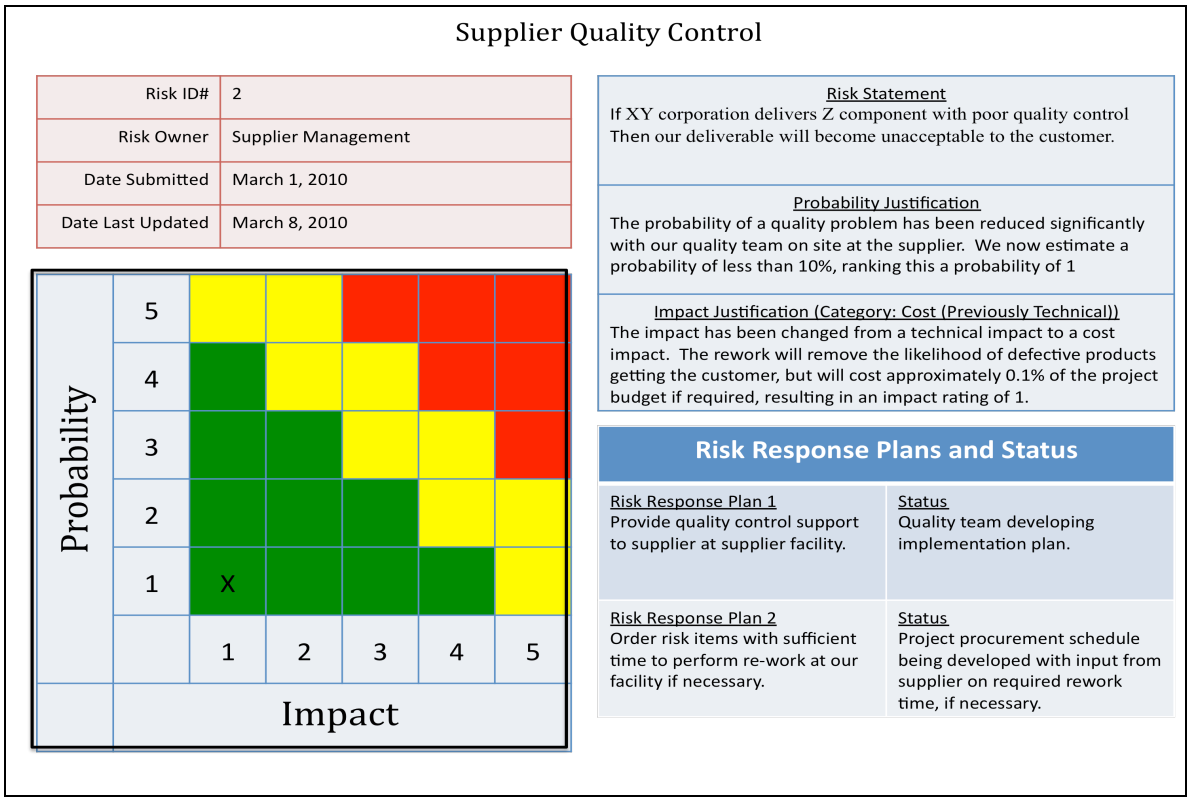


Figure 11: "Quality" risk register sheet with updates to reflect risk response progress.

Summary

Using the risk register tool described in this paper makes risk management for managers in small project environments both easy and effective. Risk sheets are filled out with a good risk statement and plans to reduce risk probability and impact, the risk response plans are incorporated into the project plans, and reporting to the customer is easy with this convenient briefing tool. The key to effective use of this tool is tailoring the probability and impact definitions to scale them in proportion with the project. The percentages used in Figures 1 & 2 are the ones that I find generally work for me. Find out what works for your customer and use that. And remember that, overall, the objective of good risk management is to "move" risks from the top right corner "red" zone to the lower left corner "green" zone. Then when risks occur and turn into "issues" the team can avoid going into "firefighting" mode because a plan is already in place.

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