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# Module 1 Introduction

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## Introduction

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### Welcome to Estimating and Risk Management Overview

This workshop will help you achieve greater success in your work. It is designed for people who manage, plan, and/or participate in project work.

*The workshop is focused on two key topics that are critical for project success:*

- Accurate estimating
- Effective risk management

**Workshop Logistics**

*Please record the logistics for your particular workshop below:*

|                         |  |
|-------------------------|--|
| <b>Instructor:</b>      |  |
| <b>Length:</b>          |  |
| <b>Times:</b>           |  |
| <b>Lunch (approx.):</b> |  |
| <b>Breaks:</b>          |  |
| <b>Facilities:</b>      |  |

## Introduction

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### Workshop Materials

*As part of this workshop, you will receive the following:*

- Workshop manual
- Case studies
- Handouts

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## How to Get the Most Out of This Workshop

Generally, what people get from any workshop is directly related to what they put in.

*To help you maximize the value you derive from Estimating and Risk Management you should consider doing the following:*

- Keep an open mind
- Respect others' views
- Participate
- Ask questions any time
- Put aside other work and problems
- Avoid outside interruptions
- Dress comfortably
- Have fun

## Introduction

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### Workshop Objectives

Estimating and Risk Management in Project Management has been designed to help you gain valuable and useful material on these two critical topics.

***By the end of this workshop, you will be able to:***

- Understand the estimating and risk management processes
- Understand how risk can affect estimating and planning
- Identify various tools and techniques available
- Practice using some of the techniques in a case study exercise
- Discuss and explore ideas, concerns and issues related to estimating and risk management
- Share experiences from your own work environment

Note that all definitions and processes included in this workshop are consistent with the *Project Management Institute Project Management Body of Knowledge*, or *PMBOK Guide*.

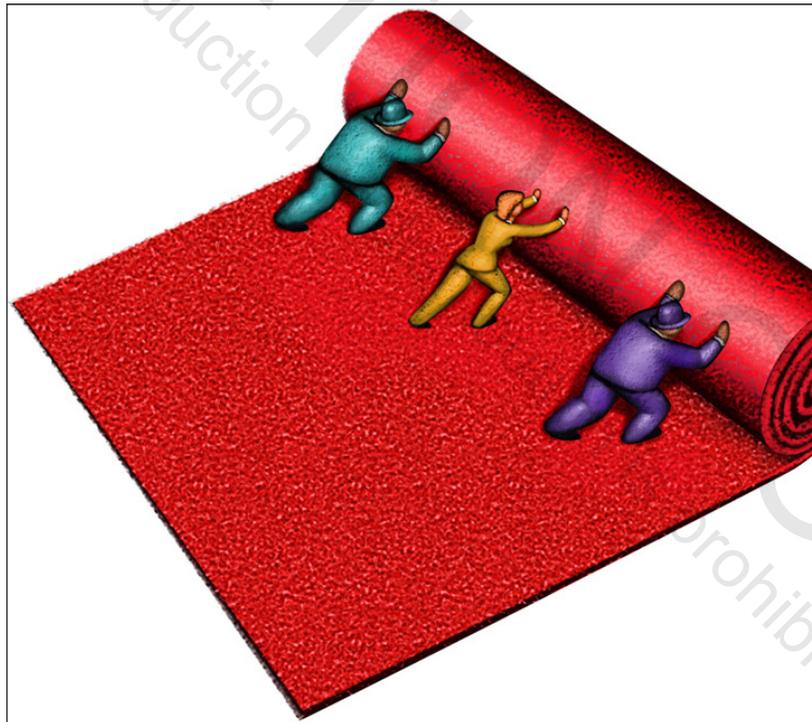
## Workshop Contents

*Estimating and Risk covers the following topics:*

- Introduction
- Definitions and Concepts
- Project Sizing
- Estimating Costs
- Estimating Effort
- Estimating Duration
- Dealing with Risk
- Risk Management Planning
- Risk Identification
- Qualitative Risk Analysis
- Quantitative Risk Analysis
- Risk Response Planning
- Risk Monitoring and Control
- Infrastructure
- Summary and Conclusion

Module 12 **Risk Monitoring and Control**

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## Risk Monitoring Control

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### Definition

Risk monitoring and control is the process of keeping track of the identified risks, monitoring residual risks and identifying new risks, ensuring the execution of risk plans, and evaluating their effectiveness in reducing risk. Risk monitoring and control records risk metrics that are associated with implementing contingency plans. Risk monitoring and control is an ongoing process for the life of the project. The risks change as the project matures, new risks develop, or anticipated risks disappear.

Good risk monitoring and control processes provide information that assists with making effective decisions in advance of the risk's occurring. Communication to all project stakeholders is needed to assess periodically the acceptability of the level of risk on the project.

*The purpose of risk monitoring is to determine if:*

- Risk responses have been implemented as planned.
- Risk response actions are as effective as expected, or if new responses should be developed.
- Project assumptions are still valid.
- Risk exposure has changed from its prior state, with analysis of trends.
- A risk trigger has occurred.
- Proper policies and procedures are followed.
- Risks have occurred or arisen that were not previously identified.

Risk control may involve choosing alternative strategies, implementing a contingency plan, taking corrective action, or re-planning the project. The risk response owner should report periodically to the project manager on the effectiveness of the plan, any unanticipated effects, and any mid-course correction needed to mitigate the risk.

## Risk Monitoring and Control

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### Assessing Success

A danger exists if the project manager makes the assumption that a risk management effort automatically guarantees success. You must verify that the project is moving forward successfully.

Two key aspects of the risk monitoring and control process must be examined.

- The first is whether or not you are successfully completing the tasks on time according to the project plan. This is verified by the schedule baseline, the network schedule.
- **The second is to ascertain if your risk reduction effort is resulting in the effective lowering of project risk. To perform this adequately, additional measurements may have to be developed and monitored throughout the project life cycle.** This is consistent with the theory of control where you measure what is happening, compare it to a baseline to determine if the performance is acceptable, and then take corrective action if needed. If the risk response isn't working, the project manager wants to know in a timely manner, so additional action can be taken before the project outcomes are jeopardized.

## Risk Monitoring Control

### Tools and Techniques

A variety of tools and techniques are available to perform risk monitoring and control.

- **Project risk response audits.** Risk auditors examine and document the effectiveness of the risk response in avoiding, transferring, accepting, or mitigating risk occurrence as well as the effectiveness of the risk owner. Risk audits are performed during the project life cycle to control risk.
- **Periodic project risk reviews.** Project risk reviews should be regularly scheduled. Project risk should be an agenda item at all team meetings. Risk ratings and prioritization may change during the life of the project. Any changes may require additional qualitative or quantitative analysis.
- **Earned value analysis.** Earned value is used for monitoring overall project performance against a baseline plan. Results from an earned value analysis may indicate potential deviation of the project at completion from cost and schedule targets. When a project deviates significantly from the baseline, updated risk identification and analysis should be performed.
- **Technical performance measurement.** Technical performance measurement compares technical accomplishments during project execution to the project plan's schedule of technical achievement. Deviation, such as not demonstrating functionality as planned at a milestone, can imply a risk to achieving the project's scope.
- **Additional risk response planning.** If a risk emerges that was not anticipated in the risk response plan, or its impact on objectives is greater than expected, the planned response may not be adequate. It will be necessary to perform additional response planning to control the risk.

**Another tool is called the Risk Watchlist.** It is a simple chart that lists critical areas that need to be watched. It is usually developed during risk response planning updated as changes occur. The format can vary depending on the intended use. The one below is intended to identify potential risk areas, point out why it is a risk area, and list potential indicators or risk events or trigger events that would let you know that this risk is about to impact the project. This tool is especially useful for keeping track of potential risks via the key indicators or triggers.

| Risk Watchlist                      |   |   |
|-------------------------------------|---|---|
| Risk Area                           | Drivers                                     | Key Indicator   |
| Short description of potential risk | What makes this a risk area on this project | What signs should we detect if this problem starts to manifest itself on this project |

## Risk Monitoring and Control

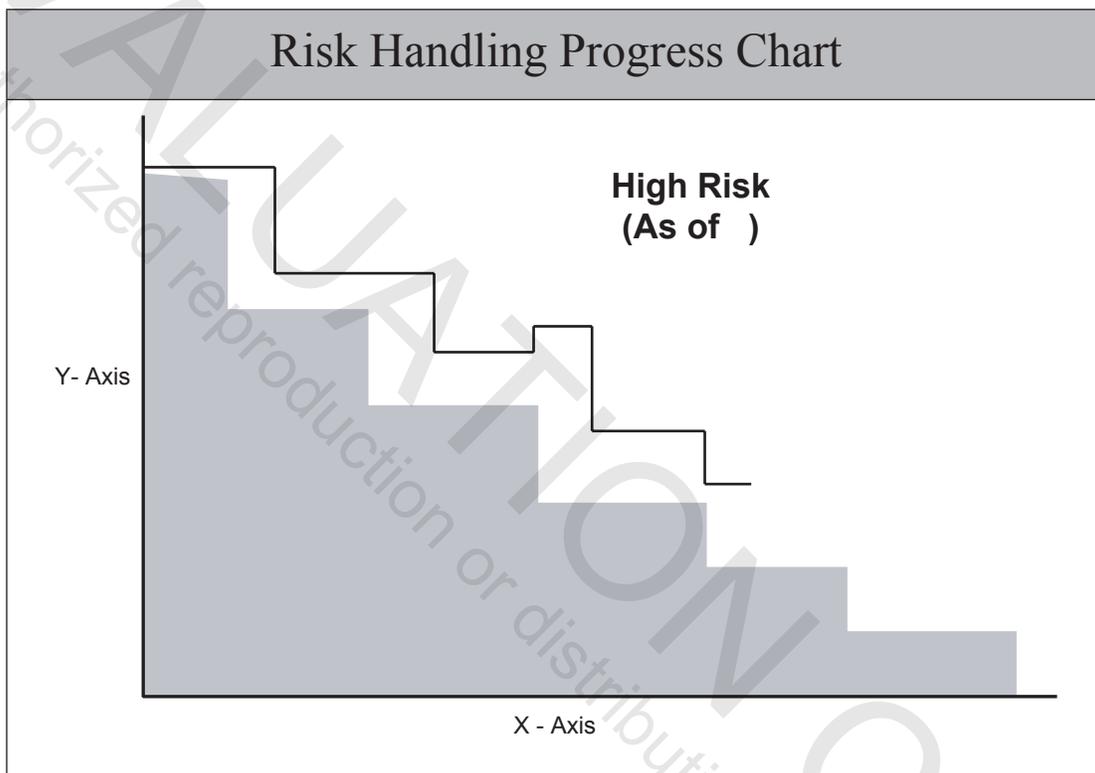
Another version is called the **Risk Handling Watchlist**. This expanded chart identifies the risk along with the potential impact on the project, and then tracks the risk monitoring and control effort by listing the risk response action, who has been assigned to manage it, and the schedule for the next update on progress. This chart is used to track efforts when a decision has been made that some definite risk response effort is necessary for the good of the project.

| Risk Handling Watchlist |   |
|-------------------------|---|
| <b>Risk Problem</b>     | Short description of potential risk   |
| <b>Risk Score</b>       | Low, Medium, High   |
| <b>Area of Impact</b>   | Cost, Schedule, Functions to be delivered   |
| <b>Action</b>           | Specific actions to be taken to reduce or handle risk: Avoid<br>Transfer Control Research Assume            |
| <b>Assigned To</b>      | Person responsible for doing or managing the effort.<br>Person you can call to obtain information on status |
| <b>Next Report Due</b>  | Schedule for progress updates, e.g., Report is due at next month's status meeting                           |

**NOTE:** The risk score is a combination of the risk probability and the impact of the risk.

## Risk Monitoring Control

The Risk Handling Progress Chart shown below is used to monitor the overall progress of the risk control effort on the project. As a result of the risk response planning, a list of high, medium, and low risks to the project has been compiled. Specific risk response initiatives have been created as a result. The chart simply takes all of the high or all of the medium risks and indicates over time when we should have evidence to indicate that our risk response has successfully controlled the identified risks. The objective is to see the big or overall picture of progress.



## Risk Monitoring and Control

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The vertical or y-axis represents the number of risks identified in either the high or medium category. The horizontal or x-axis represents time. By the end of the project, all of the high and medium risks should have been eliminated or reduced to a level that is acceptable for assumption. The solid stair step represents the plan over time to reduce the number of risks.

Each planned decrease is the result of a positive demonstration that proves an individual risk has been reduced to an acceptable limit or eliminated. This can be achieved via a test, demonstration or some other concrete proof of successful risk reduction.

What actually occurs over the life of the project is indicated by the single line tracking from the left to right. This line may not correspond to the plan, because our first try at demonstrating that a risk is reduced may not work. In fact, the line could actually go up if we didn't successfully demonstrate our risk reduction, and in the same time period, we identified a new risk.

**Another tool is the TOP 10 List.** This is similar to the watchlist. It is simply a running list of the top 10 risks that can hurt your project. This chart can have various forms. Normally, it identifies the risk, shows the action being taken, and presents a schedule indicating when the risk will be successfully eliminated or when the next status update will be given.

**Several approaches for its implementation are possible.**

- **Approach 1:** When one of the risks has been eliminated, the next highest risk on the project will be added to the chart. As the project progresses, the severity of the risks on the top 10 chart could lessen. If you get to the end of the project with no items on the chart or only risks of a very low nature, your risk response program has been a success.
- **Approach 2:** When one of the risks has been eliminated, the next highest risk at that level within the project is added to the chart. If the risks on the chart are all “high” risks, we keep adding risks to the chart as long as we have additional high risks to add. Eventually, no high risks remain to be added, and as the project approaches its end, the number of open risks on the chart will diminish.

## Risk Monitoring Control

### Recognizing New Risks

Another key element of risk response is recognizing new risks or new aspects of old risks that emerge during the project. You must have a systematic method for documenting these risk changes, quantifying the risks in terms of probability and impact, developing a risk response effort, prioritizing its importance, and incorporating the effort into the project. This also includes finding the budget to finance the new effort and assigning someone to be responsible for the activity.

Finding and documenting these changes of risk is the responsibility of *everyone* on the project team. To help in the effort, the project team should have a standard form. Shown below is one example that has been found to be very effective.

|  |   |   |  |
|--|---|---|--|
| <b>ID</b> ABC 23   | <b>Risk Information Sheet</b>   |   | <b>Identified:</b> 8/12/97   |
| <b>Priority:</b> 6   | <b>Statement of Problem:</b><br>With our limited experience working with the ABC Software, we may not be able to complete the coding and integration work according to the scheduled timeframe. Additionally, a definite possibility exists that the quality of the final product will not be what we need. |   |  |
| <b>Probability:</b> High   |   |   |  |
| <b>Impact:</b> High  |   |   |  |
| <b>Severity:</b> High  |   |   |  |
| <b>Timeframe:</b> Near   | <b>Identified By:</b> E. Sprague  | <b>Risk Class:</b> Personnel Experience | <b>Assigned To:</b> J.J. Smith   |
| <b>Context:</b> Where did the risk come from? Why is it a risk? What do we know about? Explain the background and significance of what we are dealing with.  |   |   |  |
| <b>Mitigation Strategy:</b> Explain your approach for handling this risk, including the time schedule for the actions to be taken and who will be involved.  |   |   |  |
| <b>Contingency Plan:</b> If the Mitigation Strategy doesn't produce the desired results, explain your contingency plan. For example, cancel project, deliver less than full capability to customer, not satisfy a key requirement, outsource effort with additional cost added to budget.<br><b>Trigger:</b> Date or Event that will trigger implementation of Contingency Plan. |   |   |  |
| <b>Status</b><br>This section is a series of entries documenting progress in implementing strategy   |   |   | <b>Status Date</b>   |
| <b>Approval:</b> Bob Jones, Project Mgr<br>Name of person who can approve that the risk has been successfully handled and all actions are completed  |   | <b>Closing Date:</b><br>12/05/97        | <b>Closing Rationale:</b> Explain why this risk issue can be closed at this time |

## Risk Monitoring and Control

The form is called a **Risk Information Sheet**. It is an example of the most complete form for its purpose that we have seen. Listed below is an explanation of each section.

- **Statement of Problem:** A succinct statement of the risk.
- **Identified By:** Who discovered the risk?
- **Risk Class:** What element on the project does this risk impact? More than one element can be affected by a single risk. The purpose in taking time to fill this section out is to get you to study the risk and determine all of the project areas that might be affected. Understanding the risk class can be important for assessing the impact a risk can have on a project.
- **Assigned To:** Who has the responsibility to resolve the risk? A number of people or organizations may be involved in doing work to reduce or eliminate the risk. The person listed here is the one individual who understands the overall effort and will be held accountable for ensuring that this risk is handled successfully.

**Tip:**

Always assign a risk to an individual, not an organization. An individual can be held accountable. An organizational assignment can result in finger pointing with individuals claiming they were never really the one assigned the responsibility.

- **ID:** A unique number to identify this risk. Used for tracking purposes. If earned value is being tracked, the ID may also be part of the charge number used for charging effort.
- **Priority:** Where many risks have been identified, it is important that team members know which risks should take priority in terms of work. Some organizations actually assign a priority number. For example, the top priority risk to be worked would get a very low number. The most important risk to be worked would be given a priority number of 1. The second most important would be 2. A low priority risk would be 95. In other organizations, risks are prioritized in categories. For example, category A or 1 would be risks that are significant. Category B or 2 would be somewhat less significant risks. Category C or 3 might be risks that will be monitored currently but will require action before the project ends. Category D or 4 might be risks that will be monitored and appear to require no further action if nothing changes. Whatever system you want to use is fine, but you must have a system.
- **Probability:** Initial assessment of the likelihood of this risk actually occurring. Two approaches can be used. Some organizations use an adjective approach: Low, medium, high. Others use a number approach: 1-10 where a 1 indicates a very low probability and a 10 indicates a very high certainty of occurrence.

## Risk Monitoring Control

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- **Impact:** If this risk occurs, what does it do to the project. If the risk has little effect on the project, the impact would be judged to be low. If the risk causes the project to fail, the impact would be judged to be high. Again, two approaches, adjective and numerical, tend to be used. In a 1-10 number scheme, a 1 would indicate a very low or no impact whereas a 10 would indicate an impact that could cause the project to fail.
- **Severity:** This represents an overall risk quantification combining both probability and impact together. If the numerical system is used, you simply multiply the probability and impact numbers to calculate the severity number. When the adjective approach is followed, it can be a little more subjective in some cases. The combination of a low probability and a low impact will give a low severity. Likewise, a high probability and a high impact will yield a high severity. When a low and high are combined, it is not as straightforward. Judgement starts to enter into the equation.
- **Time frame:** This section enables the team to identify if a risk response requires immediate action or some breathing room still exists before the risk could impact the project. If immediate action is necessary to prevent a disaster, “Near” would be indicated. If time exists before the risk will cause a problem, the block might still indicate “Near” if the risk response requires substantial effort, and the only way to get everything completed before the risk impacts the project is to start immediately. Other inputs might be “Intermediate” and “Far.”
- **Context:** Where did the risk come from? Why is it a risk to the project? What do we know about the risk? Explain the background and significance of the risk. Be sure to separate facts from opinions. Be specific, not general.
- **Mitigation Strategy:** Explain your approach for handling this risk so as to either eliminate it or reduce its potential impact to an acceptable level. Include a schedule for the actions to be taken and who will be involved. Again, specific details are essential.
- **Contingency Plan:** If the mitigation strategy doesn’t produce the desired results, explain your backup plan. Thinking about it now gives you more flexibility and more opportunities than waiting until the mitigation strategy actions are completed. A contingency plan is absolutely critical for all high risks that can have a significant impact on the project. Normally, a Trigger event or date is used to signal the need to employ the contingency plan. The trigger could be a test event that indicates the mitigation strategy won’t work or doesn’t satisfactorily deal with the risk. The trigger could also be a date that if reached without a satisfactory solution in place would trigger the implementation of the contingency plan.
- **Status:** This section is used to record the progress in implementing the mitigation strategy. The inputs help the project manager understand the status of the work effort, provide information updates for interested stakeholders, and leave a historical record of what was done and how did it come out.

## Risk Monitoring and Control

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- **Approval:** This is the name of the person with the authority to close out a risk and say that all necessary actions have been completed. On smaller projects, this should always be the project manager. On large projects, this authority might be delegated to the lead person in the work area impacted by the risk.

**Tip:**

Do not let the person assigned the risk responsibility also be the approval authority for closing out the risk. It is always better to have the approval authority be a different person. Keeping them separate means that the approval authority will always want to review what has been done before approving closure. This additional review performed by a separate person is more effective in making sure that everything has been considered and nothing is being missed. It is like having someone else proofread the paper you have written to detect any errors you are missing, because you have become too close to the process.

- **Closing Date:** Date the approval authority signs off that the risk is no longer a problem.
- **Closing Rationale:** An explanation of why this risk issue can now be closed. Try to avoid using general statements, such as “All required actions completed” or “Risk eliminated.” The explanation should tell something specific. If the risk was insufficient project funding, a closing rationale might be “\$200,000 of additional funding provided/ Assessment indicates sufficient funding to complete project.” If the risk was a lack of skilled personnel to work a task on the project, the closing rationale might read “Two additional engineers assigned with needed skill and experience levels/Current progress toward task completion indicates milestone date will be achieved.”

## Risk Monitoring Control

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### Outputs

- **Workaround plans.** Workarounds are unplanned responses to emerging risks that were previously unidentified or accepted. Workarounds must be properly documented and incorporated into the project plan and risk response plan.
- **Corrective action.** Corrective action consists of performing the contingency plan or workaround.
- **Project change requests.** Implementing contingency plans or workarounds frequently results in a requirement to change the project plan to respond to risks. The result is issuance of a change request that is managed by integrated change control.
- **Updates to the risk response plan.** Risks may occur or not. Risks that do occur should be documented and evaluated. Implementation of risk controls may reduce the impact or probability of identified risks. Risk ranking must be reassessed so that new, important risks may be properly controlled. Risks that do not occur should be documented and closed in the risk response plan.
- **Risk database.** A repository that provides for collection, maintenance, and analysis of data gathered and used in the risk management processes. Use of this database will assist risk management throughout the organization and, over time, form the basis of a risk lessons learned program.
- **Updates to risk identification checklists.** Checklists updated from experience will help risk management of future projects.

## Risk Monitoring and Control

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### Success Factors

A successful risk management program requires careful planning, execution and control. Some factors that can make yours successful are:

- **Make risk management an integral element of your project.** Don't give risk management only lip service or do just a little risk management to keep interested parties off your back. Develop a risk management effort and integrate it into your project approach. Document your strategy and procedures for risk management in your project plan.

**Tip:**

If the risk management effort is not outlined in the project plan, including the WBS, schedule, budget, and procedures, the likelihood of an effective risk management approach emerging on its own later in the project is close to zero.

**Tip:**

The project manager must make risk management a priority for everyone on the project and insist that everyone have a role to play.

## Risk Monitoring Control

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- **Establish an environment of open and honest communication.** Risks can not be dealt with if people are reluctant to communicate them. Sometimes people have been burned before when they identified risks. Maybe they were labeled as being negative or not team players. In other cases, people may be reluctant to communicate risks, because they might be judged as not being experts if they surface risks they don't know how to handle. Other parties may not want to identify risks, because they are afraid too many risks might result in the cancellation of a project they really want to see approved. The project manager must establish an environment where honest and open discussion of risks can be encouraged.

**Tip:**

Specifically address this matter early in the planning process by strongly endorsing open and honest communication as a team norm. Be patient. It can take time to achieve open communication.

**Tip:**

Publicly praise individuals or groups that support the risk program and the open/honest communication norm. Praise early in the project can encourage others that you are really serious about this norm.

**Tip:**

Provide a less public opportunity for team members to share risk concerns. Sometimes, members are still reluctant to speak up in a public forum. If they can visit you in your office or can talk informally with you at some neutral site, they may feel less constrained about discussing issues.

**Tip:**

Don't wait for people to come to you. Use Management By Wandering Around (MBWA). Visit your team members where they sit. The more opportunity people have to see you, the more likely you will hear what really is going on.

Warning: Be patient. You will never see all of the risks. Surprises will still happen. An effective risk management program dramatically increases the odds of success, but it will never make risk management stress free.