MGMT 4135

Project Management

Chapter-7 | Managing Risk

Introduction to Risk Management

- **RISK** is an uncertain event or condition that, if it occurs, has a positive or negative effect on the project objectives
  - Project team members come down with the flu
  - Product has to be redesigned
  - New regulations adds activities and lengthens the project
- Some risk events are known at the start of the project
  - Equipment breakdown
  - Changes in technical requirements as more is known about the project

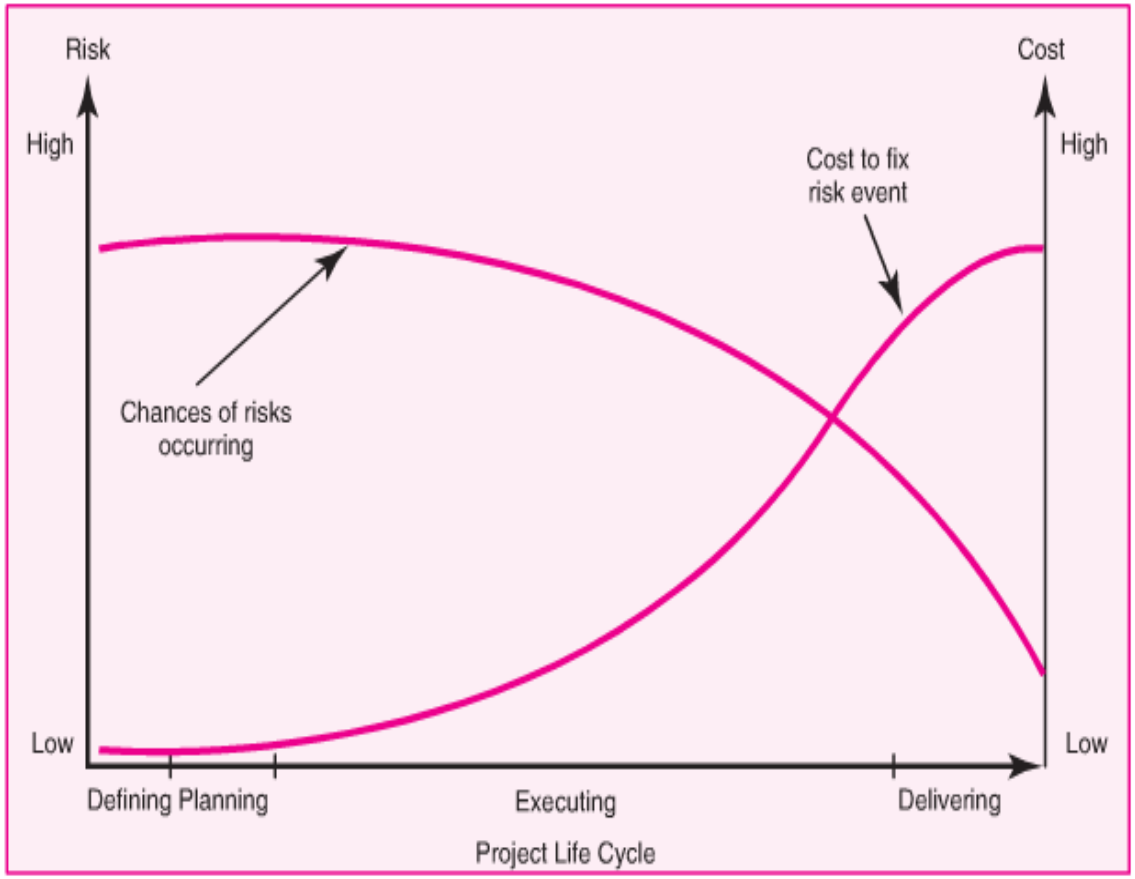
Introduction to Risk Management

- Risk management is a proactive approach rather than reactive.
- Risk management is a preventive process designed to ensure that surprises are reduced and that negative consequences are minimized.
- Project risks are unlimited. External forces:
  - Inflation
  - Market acceptance
  - Exchange rates
  - Government regulations

Introduction to Risk Management

- **Risk Management** tries to prevent something bad from happening. That is why the project manager invokes available project management processes:
  - **Project selection** systems try to reduce the likelihood that project will not contribute to the mission of the organization
  - **Project scope statements** try to avoid costly misunderstandings and scope creep.
  - **Project estimating** tries to accurately determine how much money and resources are needed to accomplish its objective.
  - **Teambuilding** reduces the dysfunctional conflict and breakdowns in coordination
  - **Stakeholder management** increases stakeholder satisfaction and chances of project success.

Risk Event Graph



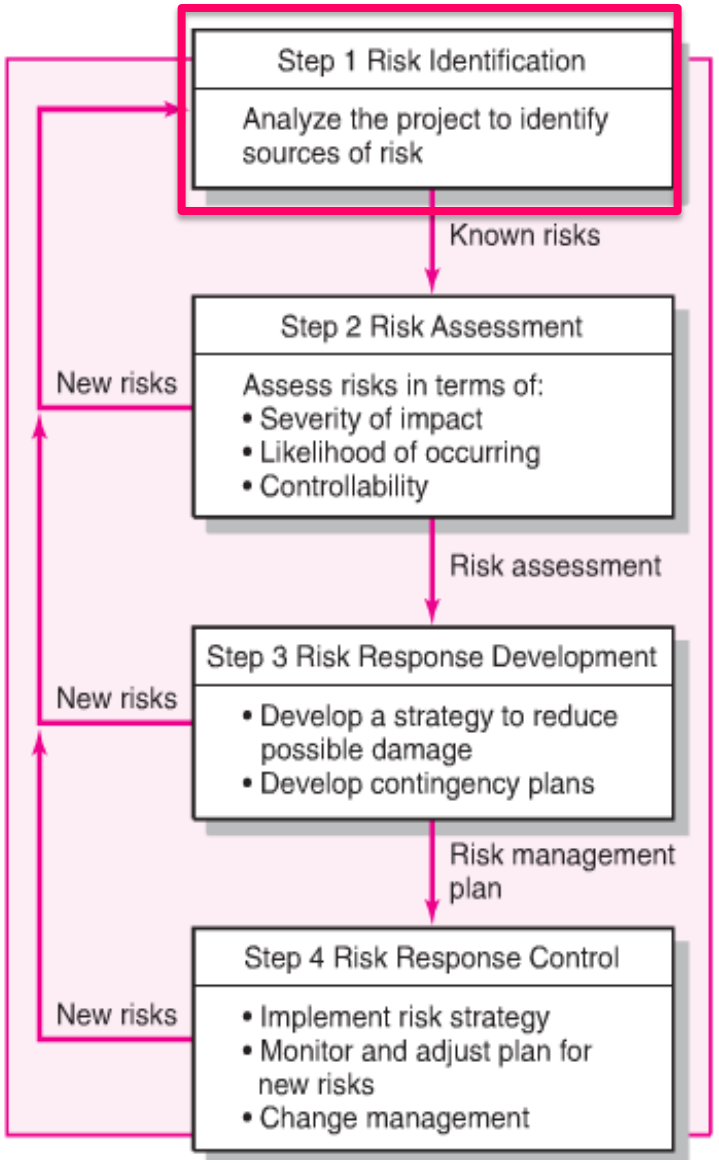
Graph:

1. Notice how risks are greater during the early parts of the project then taper off.
2. When risks occur close to delivery, the cost to fix risks greatly.
3. It is very important that risk planning and risk management occurs as soon as the project begins to minimize the devastating effects that risks can have on a project during its last phases.

Risk Management Process

Step 1: Risk Identification

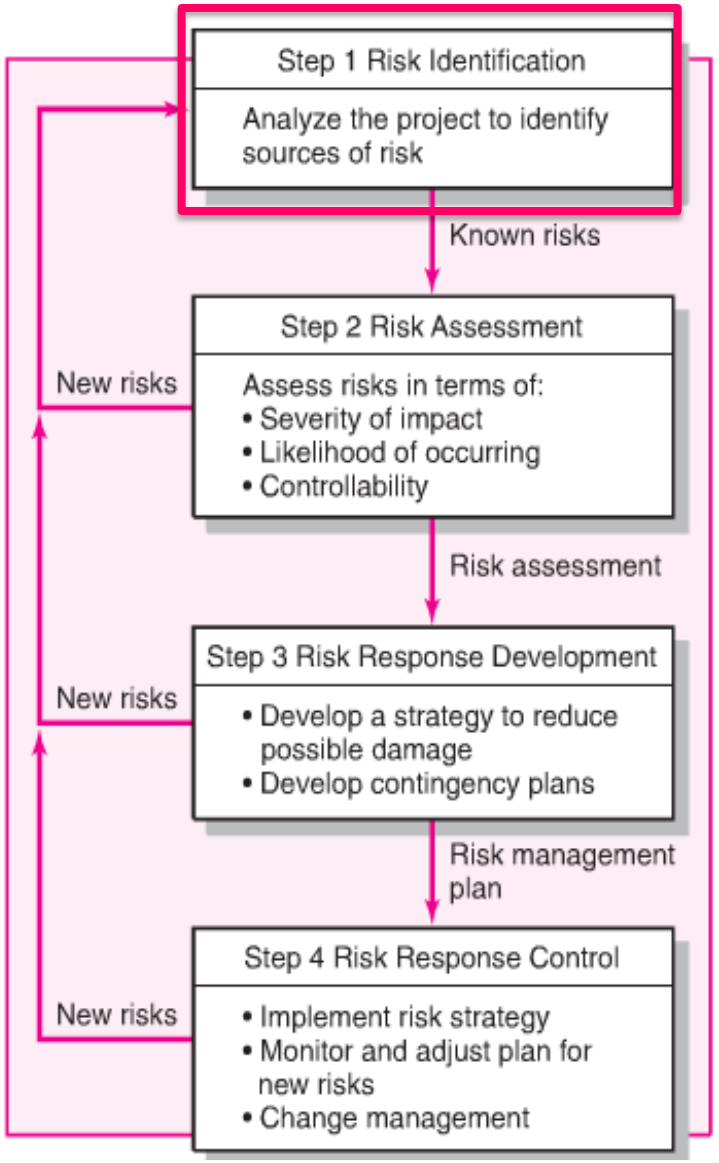
- During Planning Phase, the Project Manager works with core team members and relevant stakeholders to brainstorm on all the potential problems.
- Generate a list of all the possible risks that could affect the project.
- Mistake: focusing on objectives instead of the events that could produce consequences.
- Risk Profile Tools: Risk Breakdown Structure (RBS) pg. 214 and Product Development profile pg. 215.



Risk Management Process

Step 1: Risk Identification

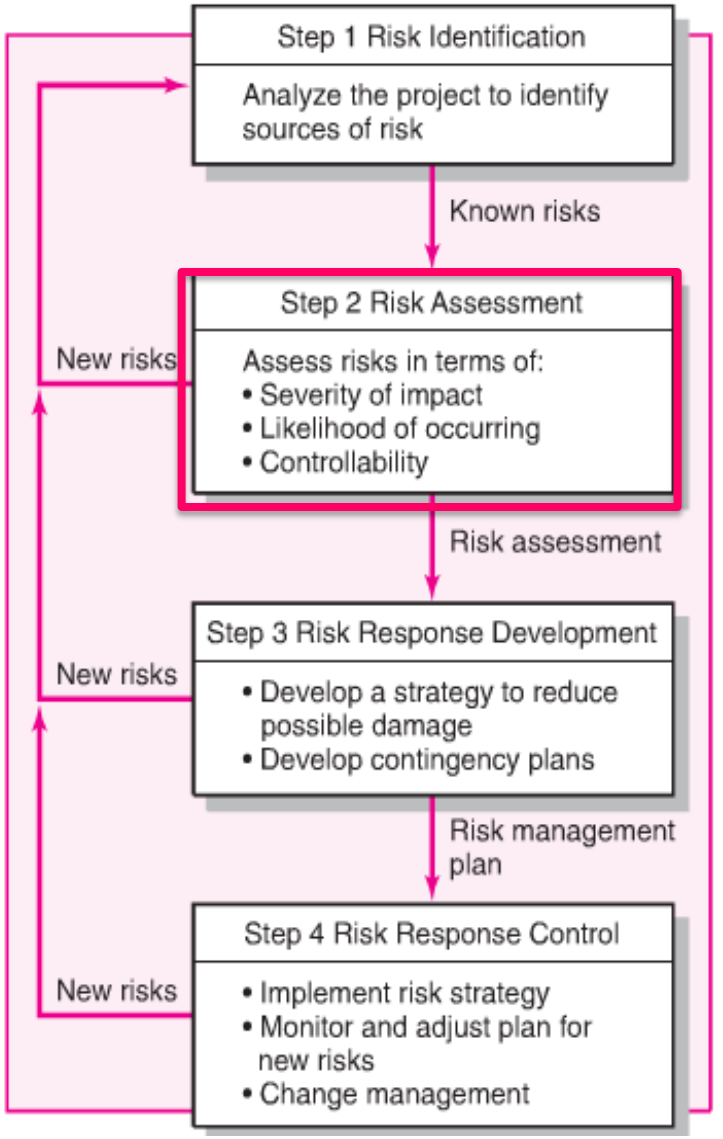
- Risk Breakdown Structure or RBS helps management identify and analyze risks.
- The generic RBS shown on pg. 214 helps focusing on risks that can affect the whole project.
- After the macro risks have been identified, specific areas of the project can then be looked at more closely.
- Risks are generally organized around specific project deliverables.
- **Risk Profiles are updated and refined during the post-project audit.**



Risk Management Process

Step 2: Risk Assessment

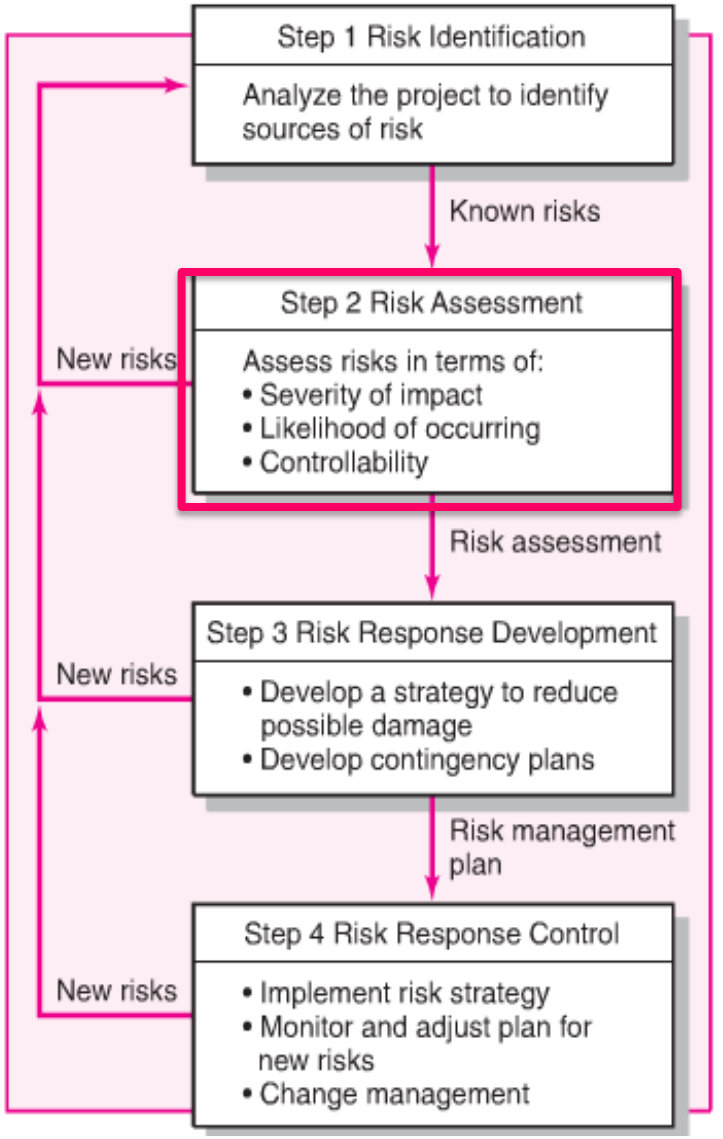
- Of all the risks identified in step-1, the most significant risks should be assessed first. All risks are analyzed in terms of **probability** and **impact**.
- **Scenario analysis** is most commonly used for analyzing risks.
- Credible and quality risk analysis requires that different levels of risk probability and impact be defined.
- Impact is to be assessed in terms of project priority.



Risk Management Process

Step 2: Risk Assessment

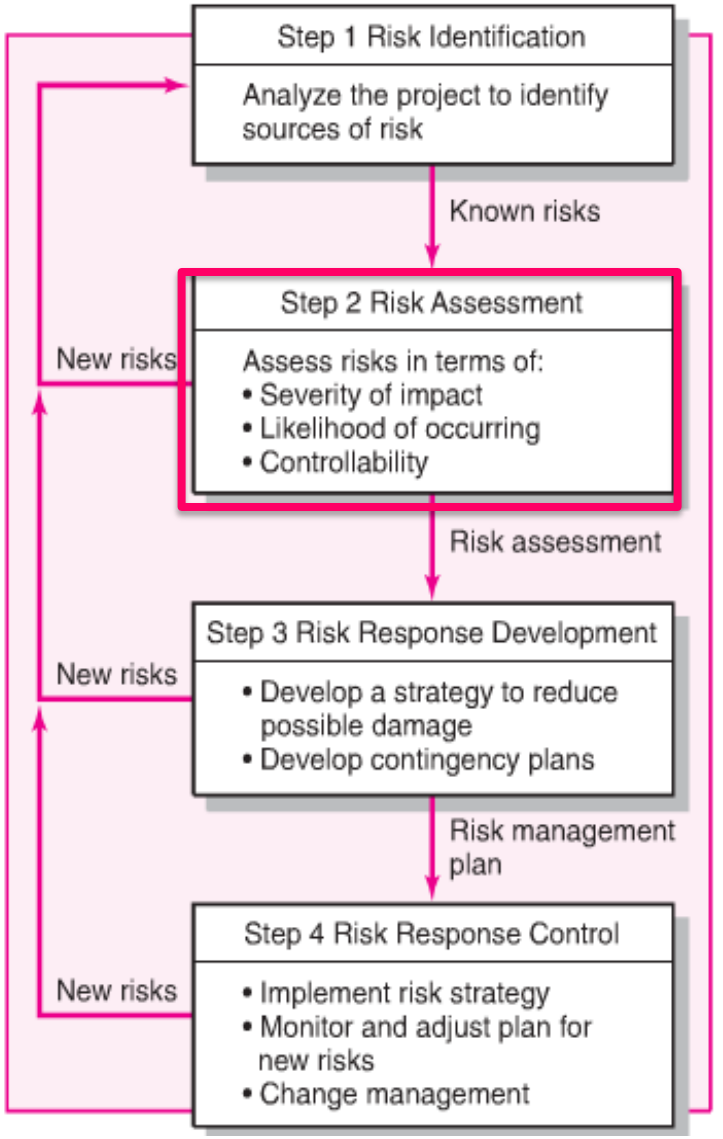
- Risk ranking needs to be established immediately.
- **Impact Scales of risk** can be seen on pg. 217. This is an example of how impact scales could be defined for cost, time, scope, and quality.
- In addition to evaluating the severity and probability of risk events, the team may also be able to assess when the risk is likely to occur. See pg. 217 “Risk Assessment Form.”



Risk Management Process

Step 2: Risk Assessment

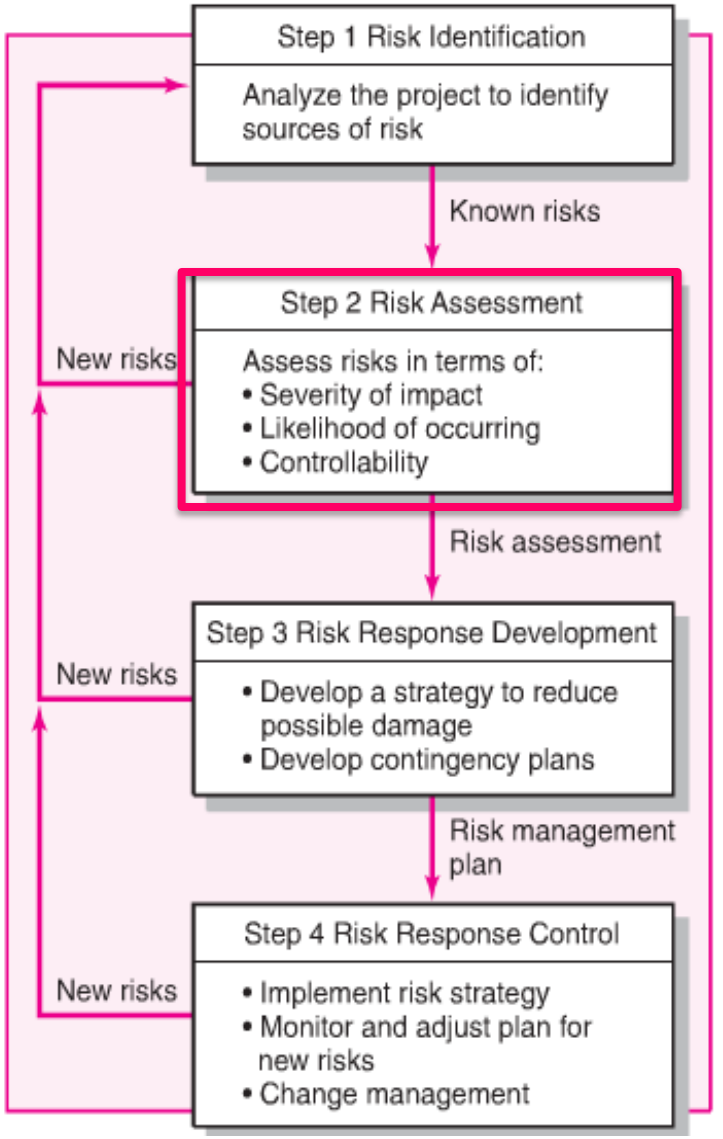
- The **risk severity matrix** provides a basis for prioritizing which risks need to be addressed:
  - RED zone risks are top priority
  - YELLOW zone are moderate and are to be addressed next
  - GREEN zone are risks that should be put on a "watch list."
- **Failure Mode and Effect Analysis** (FMEA) is a Six Sigma process. When used, it adds an additional element to impact and probability: detection.



Risk Management Process

Step 2: Risk Assessment

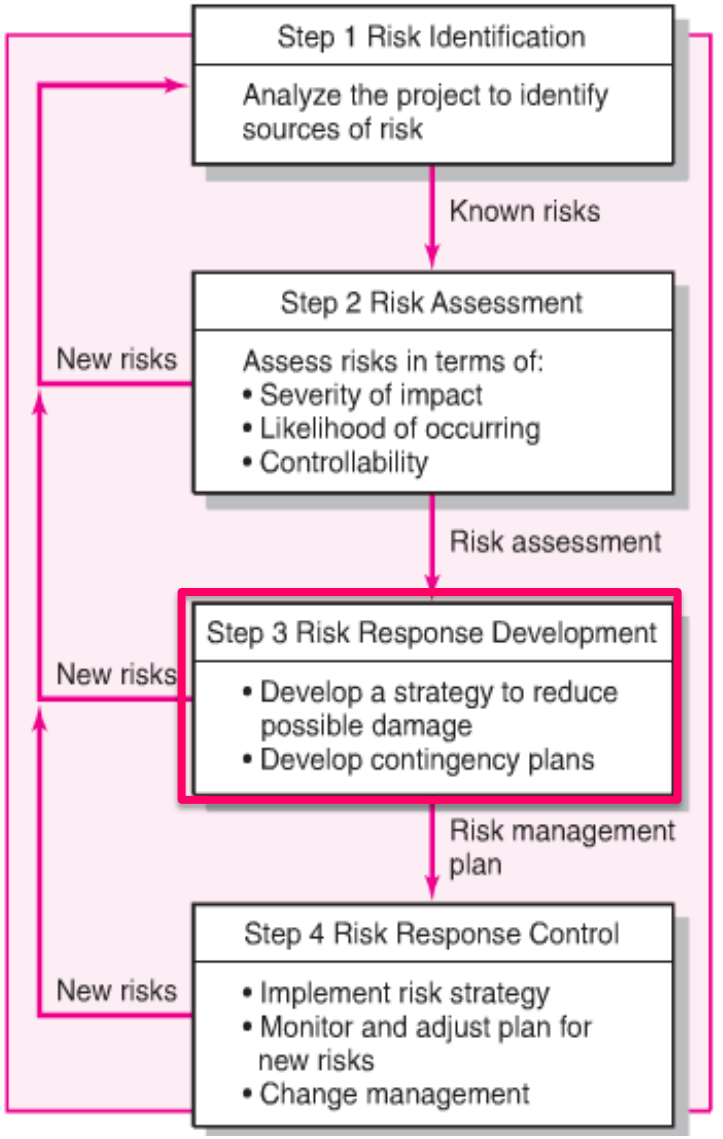
- **Failure Mode and Effect Analysis** (FMEA) is a Six Sigma process. When used, it adds an additional element to impact and probability: detection. It multiplies each of the 3 scores to arrive at a severity rate.
- **PERT** (Program Evaluation and Review Technique) simulation assumes a statistical distribution range between optimistic and pessimistic. Provides a list of potential critical paths and respective probabilities of occurring.



Risk Management Process

Step 3: Risk Response Development

- When a risk event is identified, a decision must be made on how a risk event will be responded to.
  1. Mitigate
  2. Avoid
  3. Transfer
  4. Retain

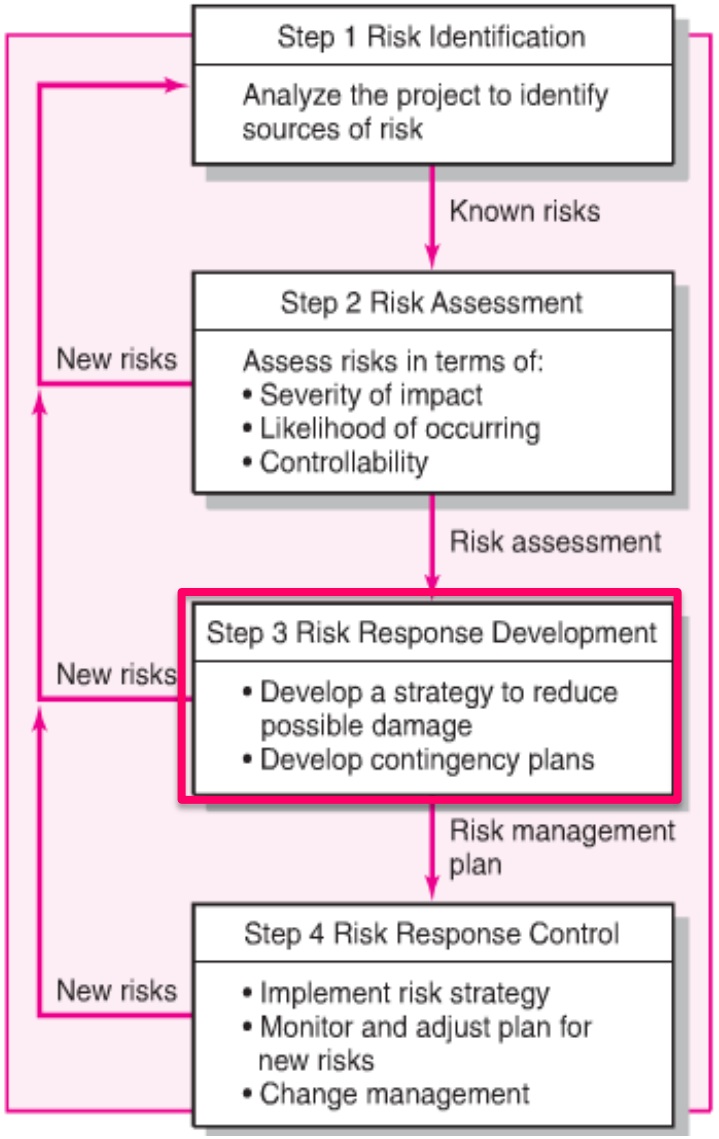


Risk Management Process

Step 3: Risk Response Development

Mitigating Risk is all about 1) reducing the likelihood that the risk will occur and 2) reduce the risk impact.

- Testing and prototyping are often used to prevent problems from surfacing and is a form of mitigation.
- Performing outdoor work in the summer, investing in up-front safety training, choosing high-quality materials and equipment – these are all forms of mitigation.

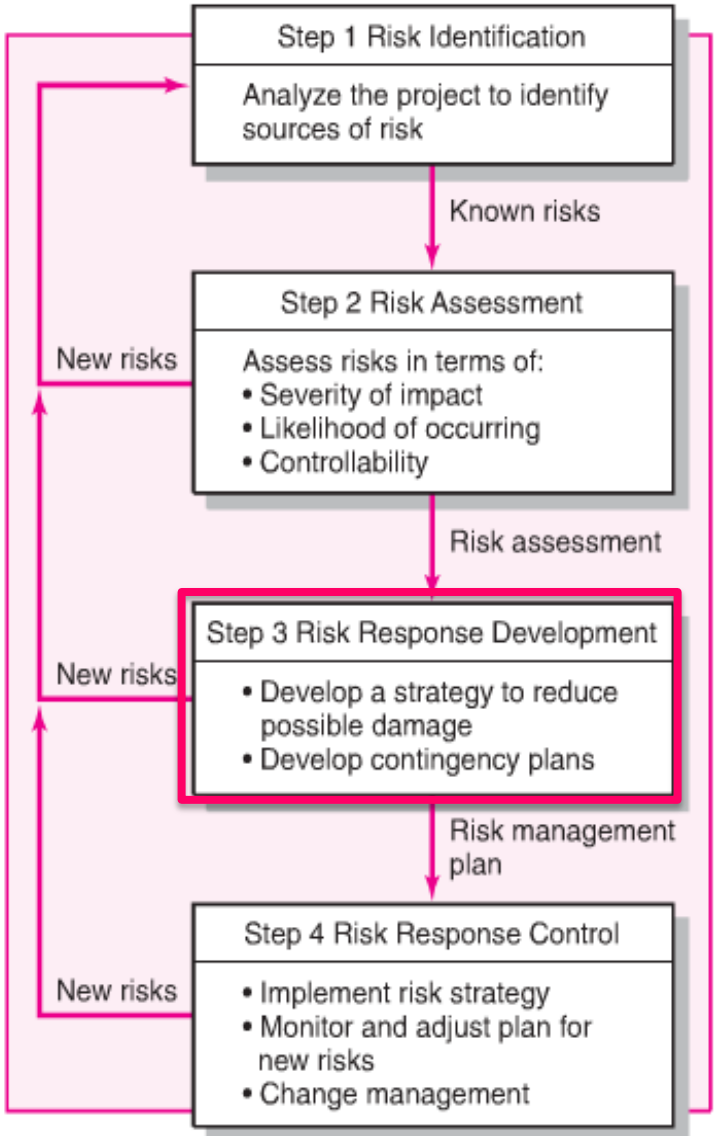


Risk Management Process

Step 3: Risk Response Development

Avoiding Risk is focused on plans to eliminate the threat and protect the project from its impact.

- Usually involves changing the project plan to eliminate the threat entirely.
- The project manager might also isolate the project objectives in question and may find that reducing scope will avoid the risk.
- The most radical avoidance strategy is to shut down the project entirely.

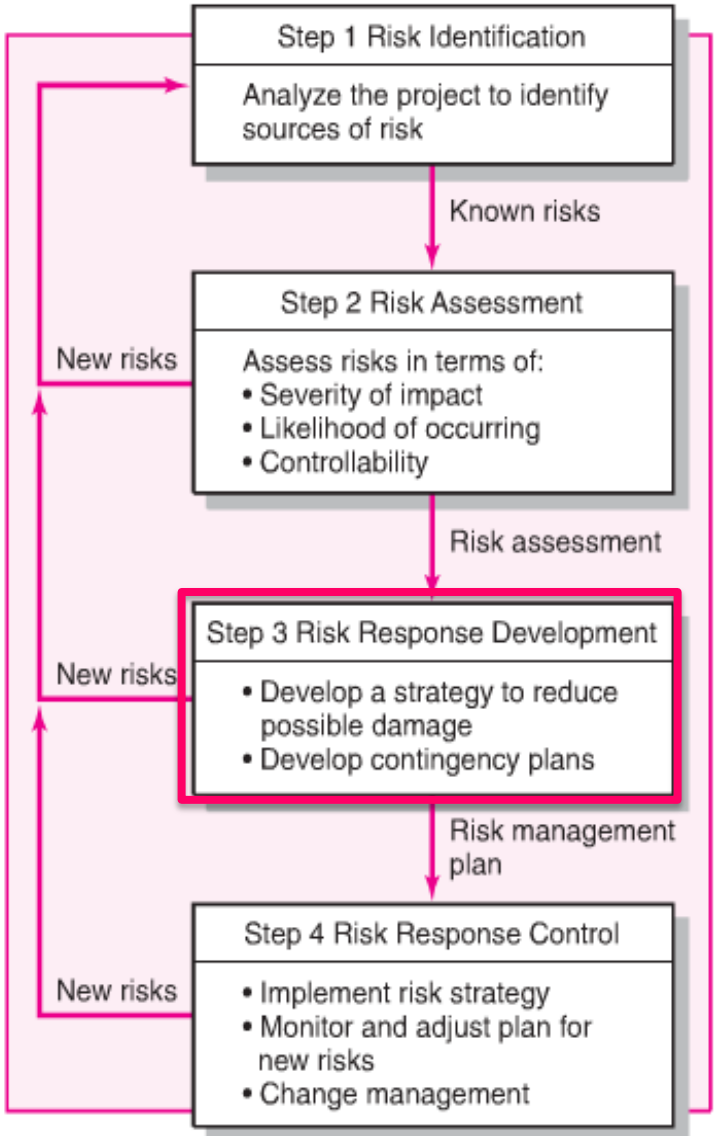


Risk Management Process

Step 3: Risk Response Development

Transferring Risk simply gives a third party the responsibility for managing the risk. (The risk is not eliminated just managed by someone else instead of the performing organization.)

- Almost always results in paying a premium for this exemption.
- This response is most effective when dealing with financial risk exposure.
- Transfer uses tools such as insurance, performance bonds, warranties, guarantees, fixed-price contracts, etc.

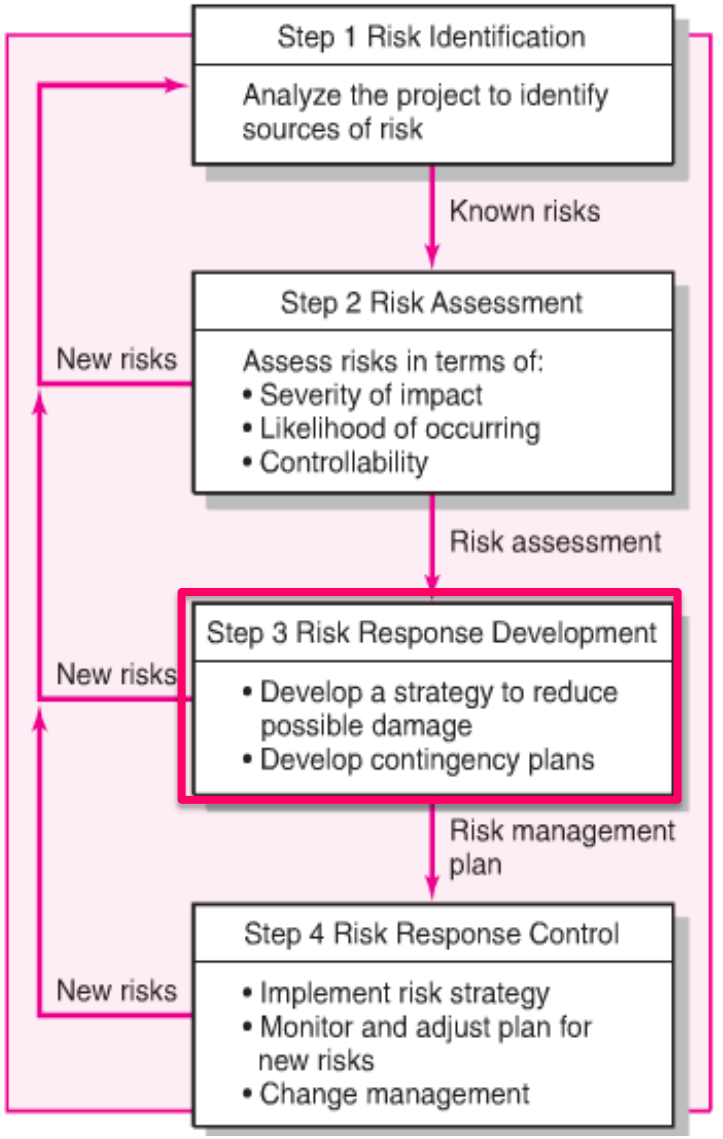


Risk Management Process

Step 3: Risk Response Development

Retaining or Accepting Risk is to accept the risk if it occurs. Some risks are too large to transfer or mitigate such as floods, earthquakes, etc. The project owner assumes the risk.

- Retaining a risk requires implementing a **contingency plan**.
- Some risk events can be ignored. If a cost overrun is the result of a risk, the performing organization states it will accept that financial risk.

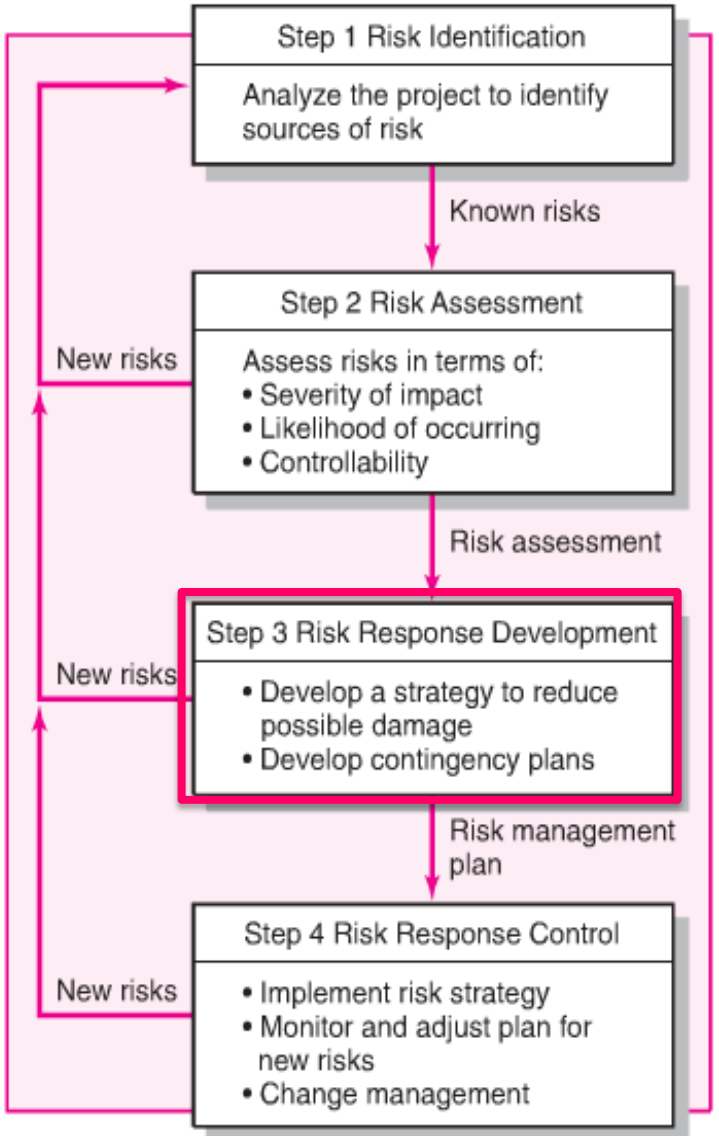


Risk Management Process

Step 3: Risk Response Development

Contingency Plan is the actions that will be taken to reduce or mitigate the negative impact of a risk event.

- While it is imperative that all risks be analyzed and prevented as much as possible, risks do occur in spite of that. A contingency plan goes into effect after a risk is realized.
- Conditions for activating or triggering a contingency plan should be decided, clearly documented, and communicated.

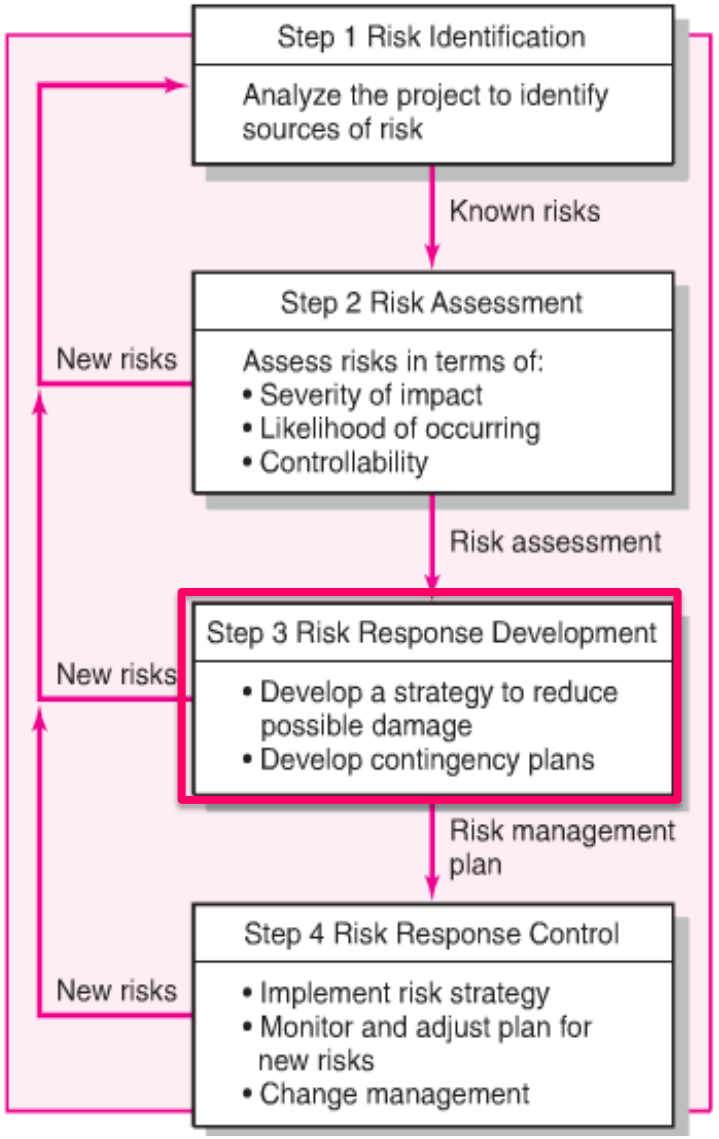


Risk Management Process

Step 3: Risk Response Development

Contingency Plan

- The plan should include a cost estimate and should identify the source of the funding.
  - Work-arounds
  - Schedule buffers
  - Contingency funds built into the budget
- All parties affected should agree to the contingency plan.
- A person must be assigned for monitoring the potential risk and for initiating the contingency plan.

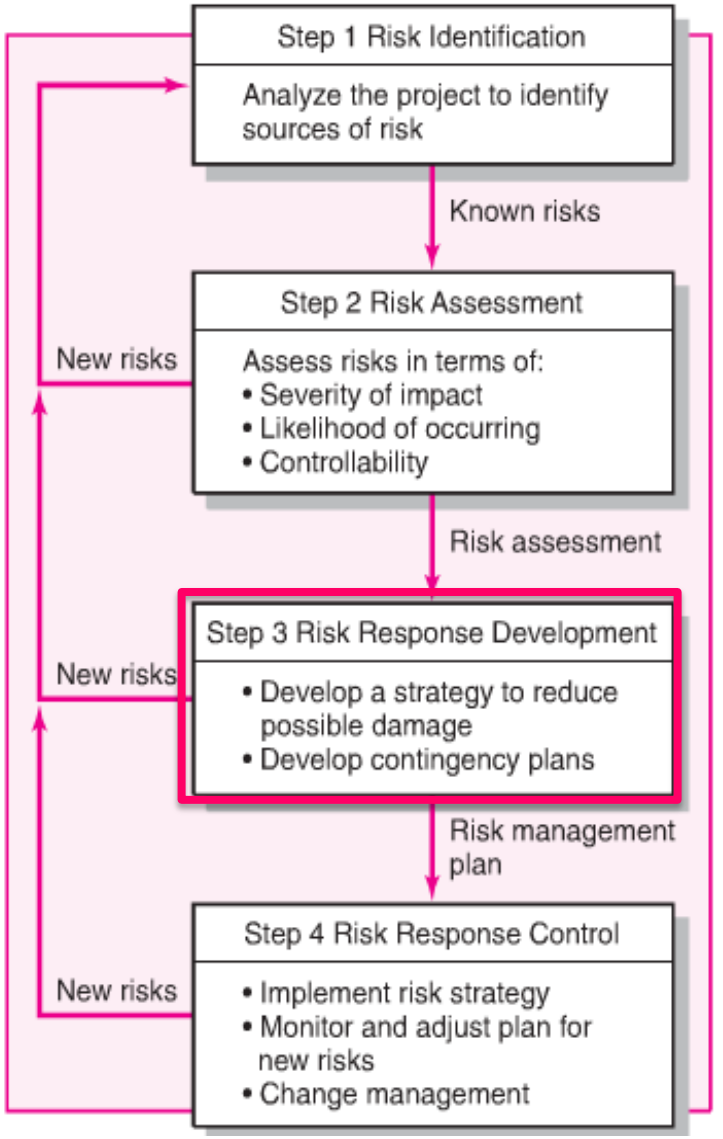


Risk Management Process

Step 3: Risk Response Development

Contingency for Technical Risks

- Technical risks can cause the project to be shut down. It looks at what happens if systems or processes fail or do not work.
- First identify the high-risk technical areas then build models or design experiments to resolve the risk quickly.
- Isolating and testing key technical questions early, project feasibility can be quickly determined, necessary adjustments made, or in some cases, closing down the project.

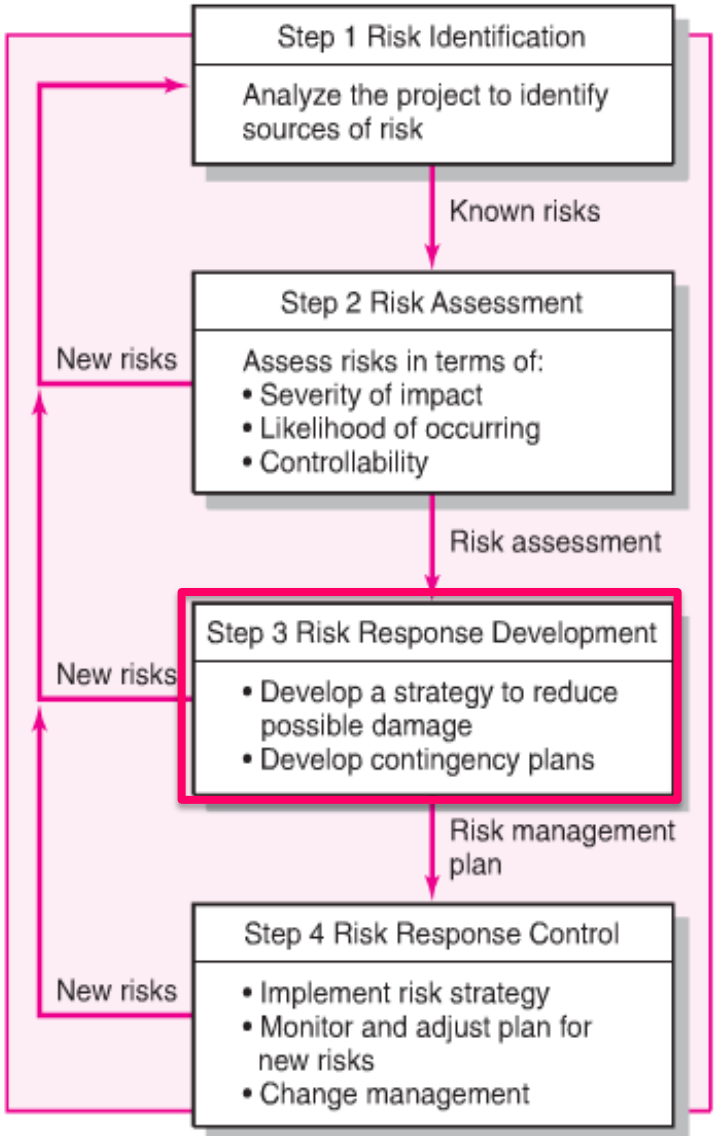


Risk Management Process

Step 3: Risk Response Development

Contingency for Schedule Risks

- Projects that will be coming in late will often use contingency funds in order to "crash" a project to get it back on track.
- Crashing reduces the project duration by compressing one or more critical path activities. This usually involves adding more resources to the activity.
- Crashing increases project cost due to funding extra resources; increases risk because of "too many cooks in the kitchen."

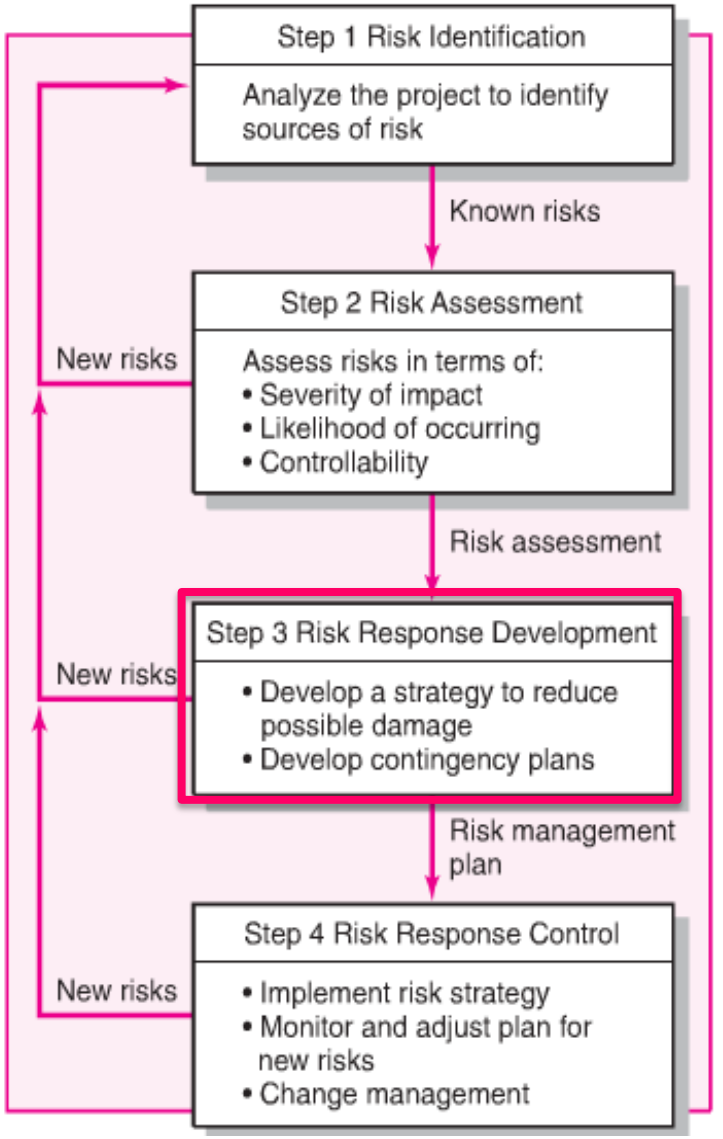


Risk Management Process

Step 3: Risk Response Development

Contingency for Cost Risks

- Long-duration projects require contingency because of price changes.
- Avoid using one lump sum to cover price risks. Lump sum does not address exactly where price protection will be needed and lacks control.

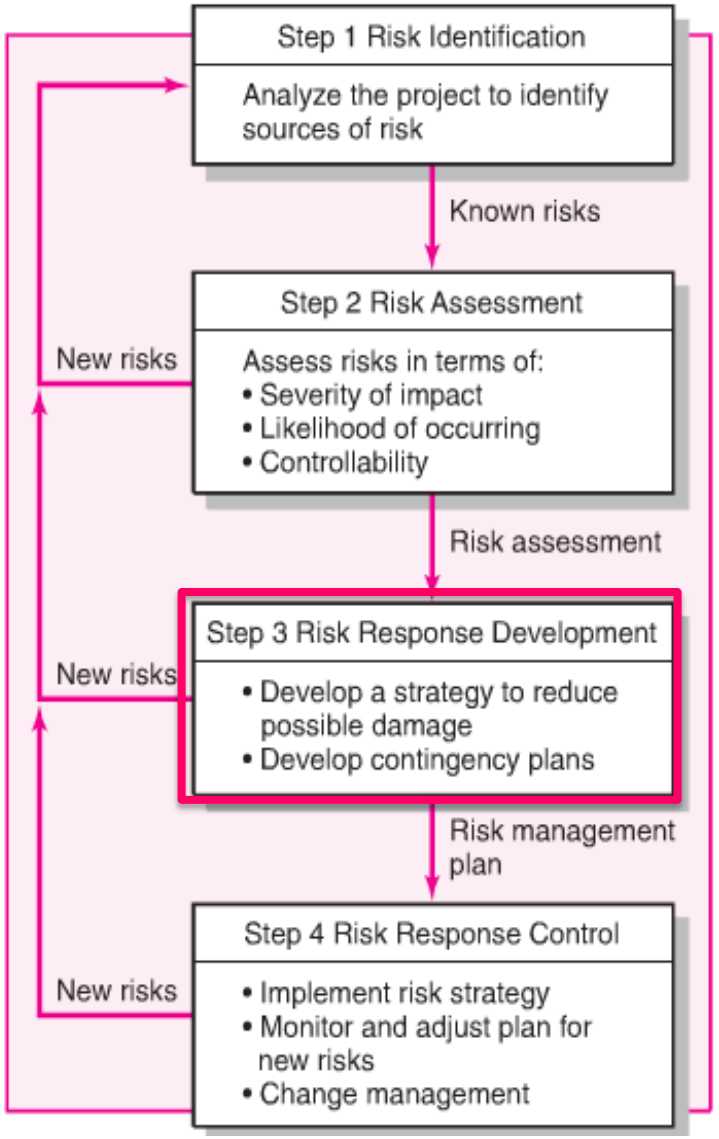


Risk Management Process

Step 3: Risk Response Development

"Funding" Risks

- Seasoned project managers recognize that a complete risk assessment must include an evaluation of funding.
- Severe budget cuts or lack of funding can have a devastating effect on a project. This is when a project scope may be scaled back to what is possible or a project may be cancelled.
- Strategy changes, budget cuts, market down-turns, changing political climate all have an affect on funding.

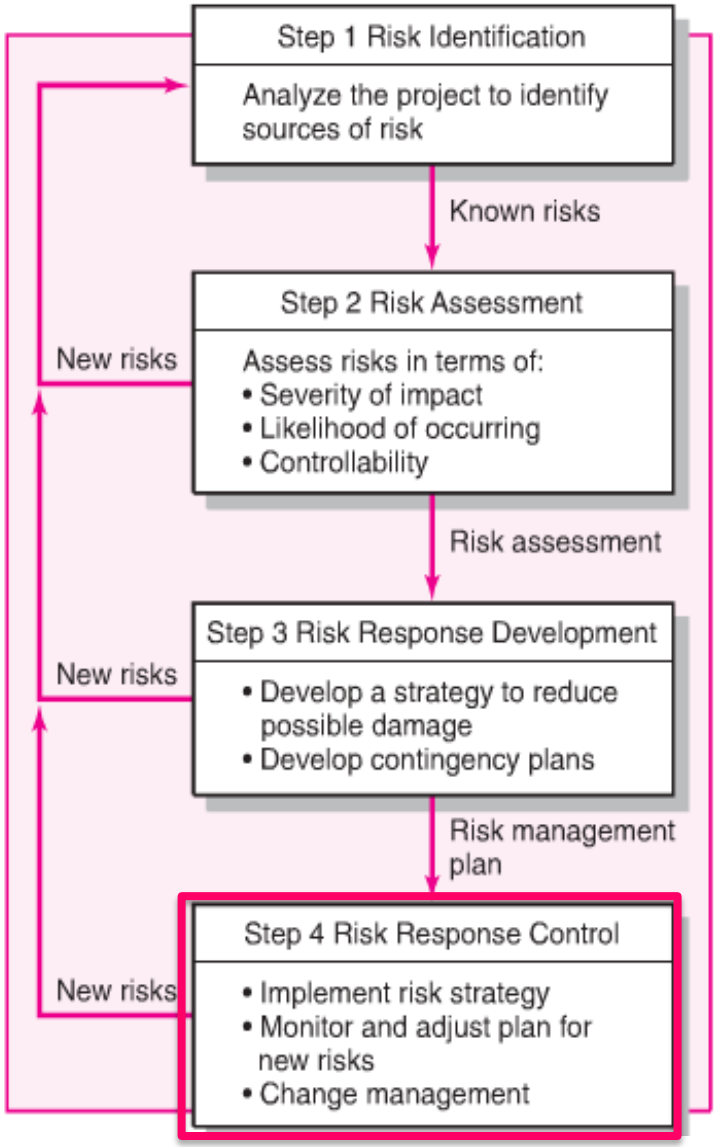


Risk Management Process

Step 4: Risk Response Control

Risk Register details all identified risks, their descriptions, category, probability, impact, response, contingency plans, owners, and current status.

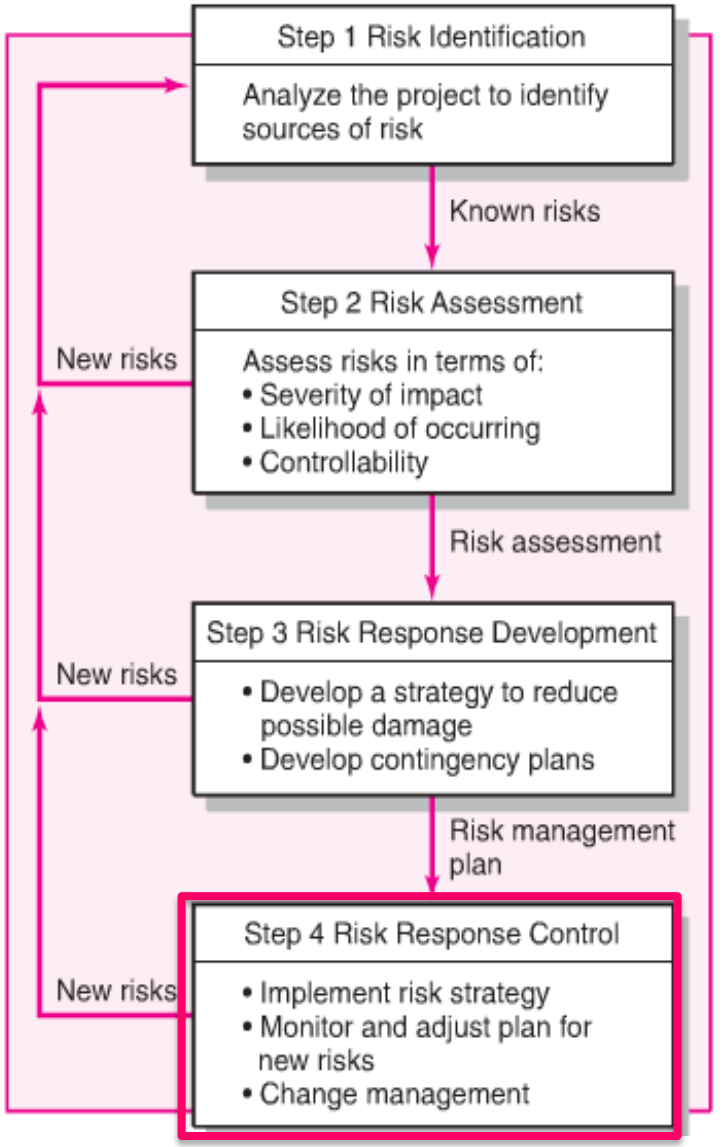
- Risk control involves executing the response strategy, monitoring triggering events, initiating contingency plans, and watching for new risks.
- Establishing a Change Management System is an essential element of risk control.



Risk Management Process

Step 4: Risk Response Control

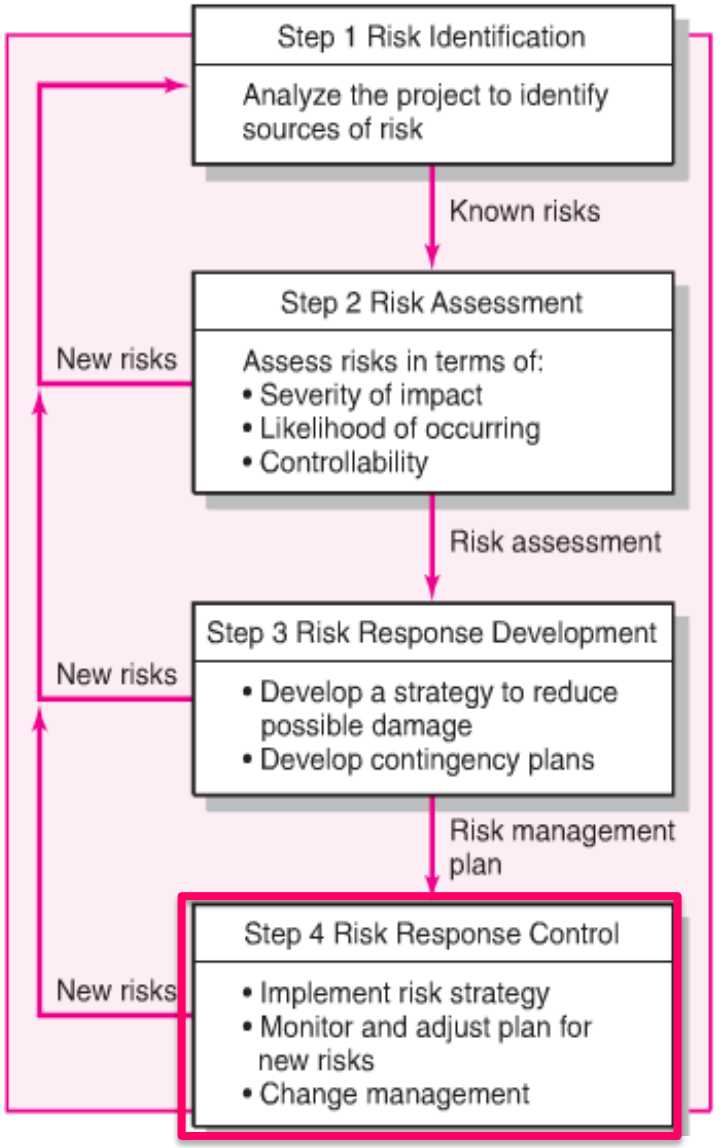
- Project managers need to monitor risks just as closely as tracking project progress; project team needs to be on constant alert for new unforeseen risks.
- Risk assessment and status of risks on the register need to be part of every project status meeting.
- The project mgr. needs to create a safe environment where participants feel comfortable raising concerns and admitting mistakes; mistakes are acceptable, hiding them is unacceptable.



Risk Management Process

Step 4: Risk Response Control

- It is advisable to repeat the Risk Identification Assessment exercise with fresh information.
- Review risk profiles and make sure relevant stakeholders are brought into the discussion.
- Risk register to be updated
- All risk are to be assigned to a resource who has full responsibility in responding to that risk(s).
- Project managers and team members need to be vigilant in monitoring risks.



Opportunity Management

- An **opportunity** is an event that can have a positive impact on project objectives. E.g. Favorable weather for construction work, drop in fuel prices create savings
- It is good sound practice to engage in active opportunity management along with risk management.
- The major difference between managing negative risk and managing opportunity is in the response:
  1. **Exploit** is a tactic to eliminate uncertainty associated with an opportunity, ensuring that it will definitely happen. E.g. assigning your best people to a critical burst activity, revising a design to enable a component be purchased externally rather than building it internally.

Opportunity Management

2. **Share** is a strategy that involves allocating some or all ownership of an opportunity to a 3rd party who is best to capture and manage this opportunity for the benefit of the project. E.g. establishing continuous improvement incentives for contractors or joint ventures.
3. **Enhance** is the opposite of mitigation in that the project seeks to increase the probability and/or the positive impact of that opportunity. E.g. Choosing site location based on favorable weather patterns; choosing raw materials that are likely to decline in price over the length of the project.
4. **Accepting** an opportunity is being willing to take advantage of it, should it occur, but not taking action to pursue it.

Contingency Funding and Time Buffers

- **Contingency funds** are established to cover project risks.
- Project sponsors are reluctant to set up project contingency funds as that would seem to imply that the project plan might be a poor one.
- Some see contingency funds as slush funds; others say they will face the risk when it happens and not before.
- Overcome these obstacles by carefully documented risk identification, assessment, contingency planning, and determine when and how funds will be disbursed.
- Risk “unknowns” and uncertainty come from the newness of the project, inaccurate time and cost estimates, technical unknowns, unstable scope, and unanticipated problems.

Contingency Funding and Time Buffers

- It is not unusual for high-technology projects to fund contingencies running in the 20 to 60 percent range.
- The use and rate of reserves consumption must be closely monitored, controlled, and documented.
- **Budget and Management Reserves**
  - **Budget reserves** are set up to cover identified risks and are allocated to specific segments or deliverables of the project.
  - Budget reserves are determined by costing out the accepted contingency plan.
  - The budget reserve should be communicated to the team. This fosters trust and encouragement of good performance.
  - If risk does not happen, funds are removed from the budget reserve. This reserve decreases as the project progresses.

Contingency Funding and Time Buffers

- **Budget and Management Reserves**
  - **Management reserves** are set up to cover unidentified and unforeseen risks. These reserves are allocated to all risks associated with the total project.
  - Management reserves are setup after the budget reserves are identified and the funds are established.
  - These reserves are independent of budget reserves and are controlled by the project manager.
  - Technical reserves are held in management reserves and are controlled by the project sponsor or top management.
  - Management reserves are controlled by the project manager and the sponsor; they decide when a contingency plan will be implemented and when reserves are used.

Contingency Funding and Time Buffers

- **Time Buffers** are used by project managers use time buffers to cushion against potential delays in the project. Like contingency funds, the amount of time buffered is dependent upon inherent uncertainty of the project.
  - The more uncertain the project, the more time should be reserved for the schedule on critical activities (critical path).
  - **Buffers are added to:** 1) activities with severe risks, 2) merge activities that are prone to delays due to preceding activities being late, 3) non-critical activities to reduce the likelihood that another critical path will emerge, and 4) activities that require scarce and constrained resources.
  - Buffers are normally added to the end of the project. Use of time buffers requires the authorization of top management.

Change Control Management

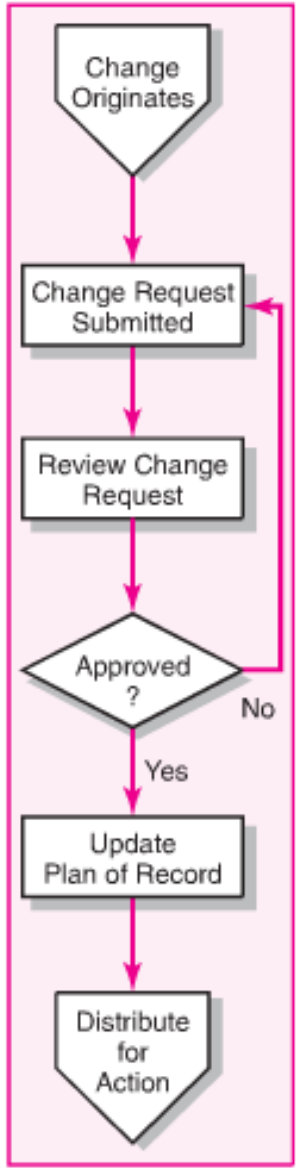
- **Change Management** is a major element of risk control. Changes come from many sources and easily fall into three categories:
  1. Scope changes in the design or additions. E.g. customer requests a new feature; a redesign will improve the product outcome.
  2. Implementation of contingency plans represent changes in baseline costs and schedules and must be reported to change management.
  3. Improvement changes suggested by the project team.
- Changes to a project are almost certain. A well-defined change review and change control process should be established early in the project.

Change Control Management

- **Change Management Systems** involve reporting, controlling and recording changes to the project baseline. Change management systems are designed to accomplish the following:
  1. Identify proposed changes
  2. List expected effect of the proposed changes to schedule and budget
  3. Formally review, evaluate, and approve/disapprove changes
  4. Negotiate and resolve conflicts of change, conditions, and cost
  5. Communicate changes to affected parties
  6. Assign responsibility for implementing the change
  7. Adjust the master schedule and budget
  8. Track all changes that are to be implemented

Change Control Management

- The project communications plan defines the decision-making process that will be used to evaluate and accept change. See diagram.
- Assessing the impact of the change to the project is of particular importance. Sometimes the solution can have an adverse affect on other segments of the project.
- Change Request Forms are often used to describe the change being submitted. The change control board will assign a tracking log number.
  See pg. 232 for a sample change request.
- The WBS and the schedule must be updated to reflect this approved change.



Change Control Management

- **Benefits** of a change control system include:
  - Inconsequential changes are not passed through this formal process
  - Cost of change is maintained in a log. *See Figure 7.11 pg. 233*
  - Integrity of the WBS and performance measures are maintained
  - Allocate of budget and management reserves are tracked
  - Responsibility for implementing the change is clarified
  - Implementation of the change is monitored
  - Scope changes should be quickly reflected in baseline and performance measure.

Change Control Management

- **DOCUMENTATION** is the most critical and important element of the change control system.
- The change control historical logs helps satisfy customer inquiries, identifies the details of problems in post-project audits, and aides in estimating future similar project costs

Chapter-7 Key terms:

Avoiding risk, 220	Opportunity, 227	Risk profile, 214
Budget reserve, 228	Retaining risk, 222	Risk severity matrix, 218
Change management system, 231	Risk, 211	Scenario analysis, 16
Contingency plan, 223	Risk breakdown structure (RBS), 214	Time buffer, 229
Management reserves, 228	Risk register, 229	Transferring risk 221
Mitigating risk, 219		