




Technical Project Management Engineers' Week 2009

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Technical Project Management: Outline

- A. What Is Project Management?***
 - *What is a Project?*
- B. Why Is Project Management Needed?***
- C. Who Is Involved With Project Management?***
- D. When Does Project Management Occur?***
- E. Where Is Project Management Done?***
- F. How Is Project Management Done?***
- G. Certification Process (By Project Management Institute (PMI))***

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What is Project Management?



Some might say it is the art of creating the illusion that any outcome is the result of a series of predetermined, deliberate acts when, in fact, it was dumb luck.

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What Is Project Management?

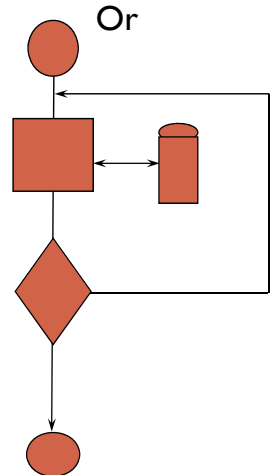
Others might say it is...

- A set of activities to **PLAN, MONITOR, COORDINATE,** and **REVIEW** a systems development project

Or

- Management activities that include:
 - Estimation costs
 - Preparation of schedules
 - Application of standards
 - Preparation and evaluation of proposals

A systematic approach



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What is Project Management?

Official PMI Definition:

Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project.

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WHAT IS A PROJECT??

- **General Definition:** *A temporary endeavour undertaken to create a unique product or service.*

Or

- **PMI:** *An endeavour in which human, material and financial resources are organised in a novel way, to undertake a unique scope of work of given specification, within the constraints of cost and time.*

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Project Management

- **Project Planning**
 - Definition of work requirements
 - Definition of quantity and quality of work
 - Definition of resources needed
- **Project monitoring**
 - Tracking progress
 - Comparing actual outcome to predicted outcome
 - Analyzing impact
 - Making adjustments

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What is a Project?

- **Has a specific objective (which may be unique or one-of-a-kind) to be completed within certain specifications**
- **Has defined start and end dates**
- **Has funding limits (if applicable)**
- **Consumes human and nonhuman resources (i.e., money, people, equipment)**
- **Is multifunctional (cut across several functional lines)**

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Operations and projects differ:

- Operations are ongoing and repetitive
- Projects are temporary and unique
- “A project is a temporary endeavor undertaken to create a unique product or service.”
 - temporary - definite beginning and end
 - unique - different in some distinguishing characteristic

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Why do PM?

- The Bottom line

- Project management provides a system for planning, documenting, organizing, and communicating.
- Project Management provides a basis for better decisions

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Project Management Value

- Why do organizations want this?
 - Deliver projects successfully
 - Achieve project objectives
 - Goal clarity and measurement
 - Coordinated resources
 - Risk identification and management
 - Cost savings
 - Efficiency of repeatable processes

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Why do you need project management techniques?

- “The reason for organizing an assignment as a project is to **FOCUS** the responsibility, authority, and scheduling of the project in order to meet defined goals.”
 - schedule
 - cost
 - performance (quality)

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Who Should be on the Project Team?

- GOAL: Early CROSS-FUNCTIONAL Cooperation

- Internal Stakeholders:**

- R&D, Development ,Engineering, Manufacturing, Purchasing, Production, Quality Assurance, Quality Control, Finance, Legal, Publications, Sales, Marketing, Customer Support

- External Stakeholders:**

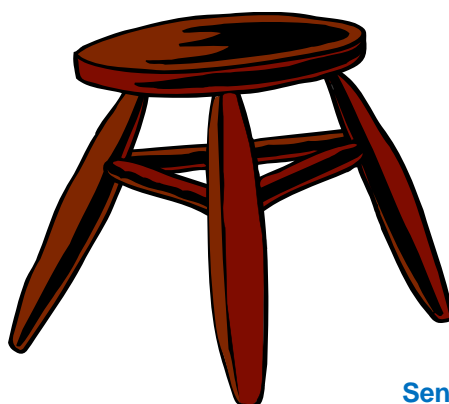
- Customers, Vendors, Suppliers, Partners, Community Members, Champions, Third Party Developers, Regulatory Agencies

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The Team: A Three-Legged Stool



Project
Manager

Management
Line

Senior
Management
(I.e. Sponsor)

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Who Is A Project Manager?

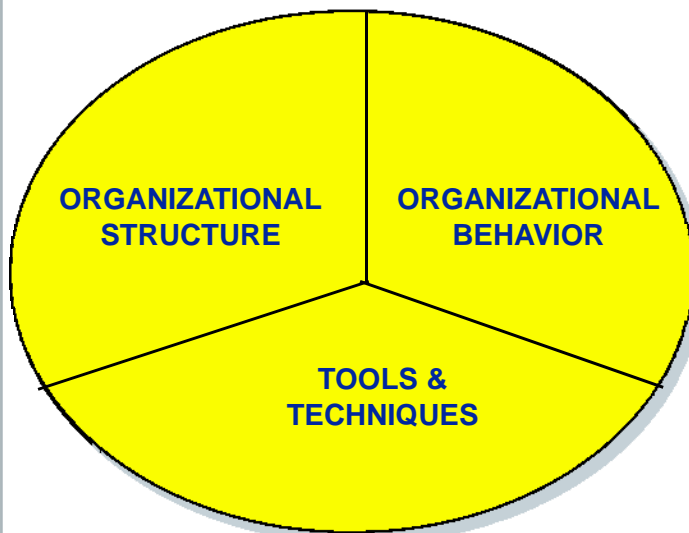
- Someone responsible for
 - Planning (strategic)
 - Scheduling and coordinating (tactical)
 - Working with people (soft skills)

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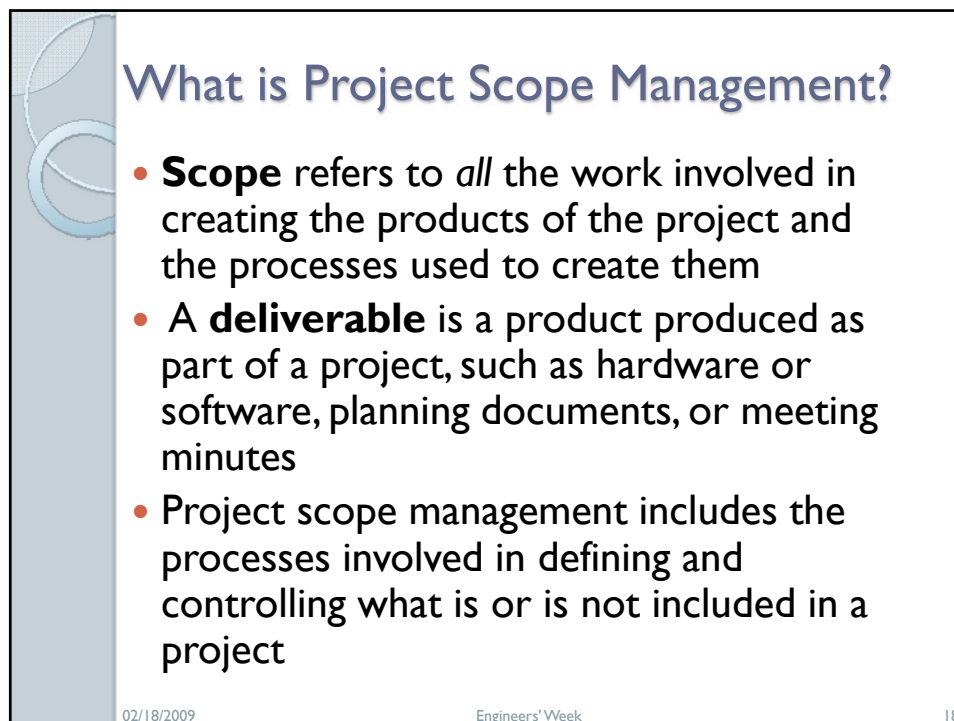
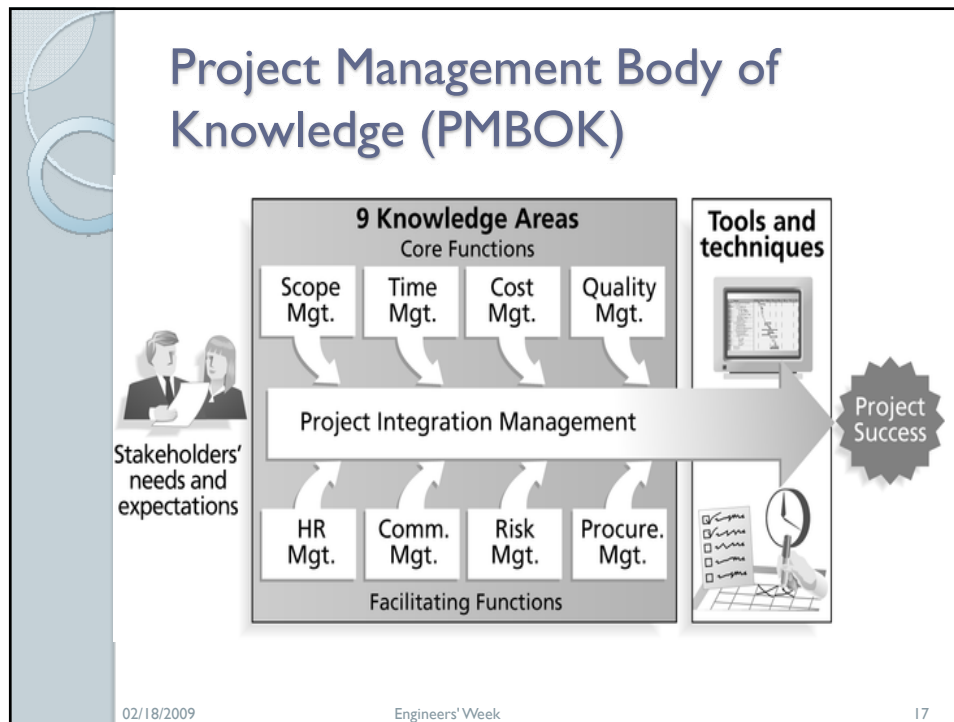
TOP OF THE THREE - LEGGED STOOL



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Project Scope Management Processes

- **Scope planning:** deciding how the scope will be defined, verified, and controlled
- **Scope definition:** reviewing the project charter and preliminary scope statement and adding more information as requirements are developed and change requests are approved
- **Creating the WBS:** subdividing the major project deliverables into smaller, components
- **Scope verification:** formalizing acceptance of the project scope
- **Scope control:** controlling changes to project scope

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Creating the Work Breakdown Structure (WBS)

- A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
- WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes
- **Decomposition** is subdividing project deliverables into smaller pieces
- A **work package** is a task at the lowest level of the WBS



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The WBS Dictionary and Scope Baseline

- Many WBS tasks are vague and must be explained more so people know what to do and can estimate how long it will take and what it will cost to do the work
- A **WBS dictionary** is a document that describes detailed information about each WBS item
- The approved project scope statement and its WBS and WBS dictionary form the **scope baseline**, which is used to measure performance in meeting project scope goals

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Scope Verification

- It is very difficult to create a good scope statement and WBS for a project
- It is even more difficult to verify project scope and minimize scope changes
- **Scope verification** involves formal acceptance of the completed project scope by the stakeholders
- Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

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Scope Control

- **Scope control** involves controlling changes to the project scope
- **Goals of scope control** are to:
 - Influence the factors that cause scope changes
 - Assure changes are processed according to procedures developed as part of integrated change control
 - Manage changes when they occur
- **Variance** is the difference between planned and actual performance

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Using Software to Assist in Project Scope Management

- Word-processing software helps create several scope-related documents
- Spreadsheets help to perform financial calculations and weighed scoring models, and develop charts and graphs
- Communication software like e-mail and the Web help clarify and communicate scope information
- Project management software helps in creating a **WBS**, the basis for tasks on a Gantt chart
- Specialized software is available to assist in project scope management

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Project Time Management

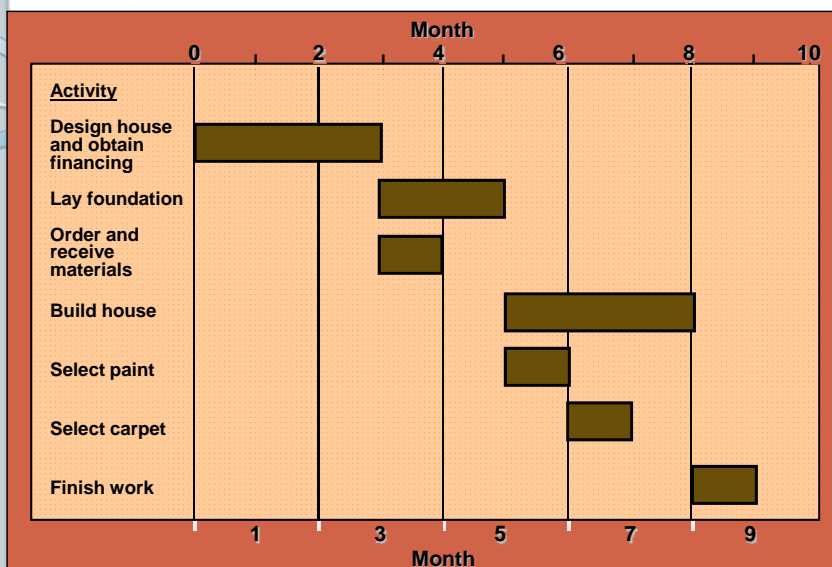
- Steps
 - Continue form WBS
 - Define activities
 - Sequence activities
 - Estimate time
 - Develop schedule
- Techniques
 - Gantt chart
 - CPM
 - PERT
 - Microsoft Project

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Example of Gantt Chart

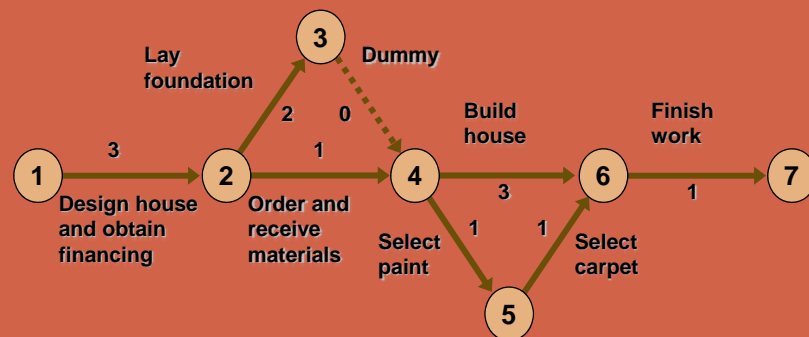


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Project Network for a House



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Critical Path

Activity	LS	ES	LF	EF	Slack S
*1	0	0	3	3	0
*2	3	3	5	5	0
3	4	3	5	4	1
*4	5	5	8	8	0
5	6	5	7	6	1
6	7	6	8	7	1
*7	8	8	9	9	0

* Critical Path

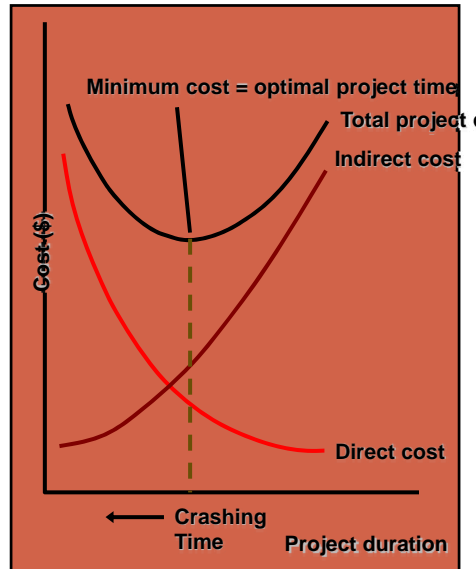
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Time-Cost Relationship

- Crashing costs increase as project duration decreases
- Indirect costs increase as project duration increases
- Reduce project length as long as crashing costs are less than indirect costs



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Project Cost Management

- “The processes involved in planning, estimating, budgeting, and controlling costs so that the budget can be completed within the approved budget”

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How Do We Manage Cost?

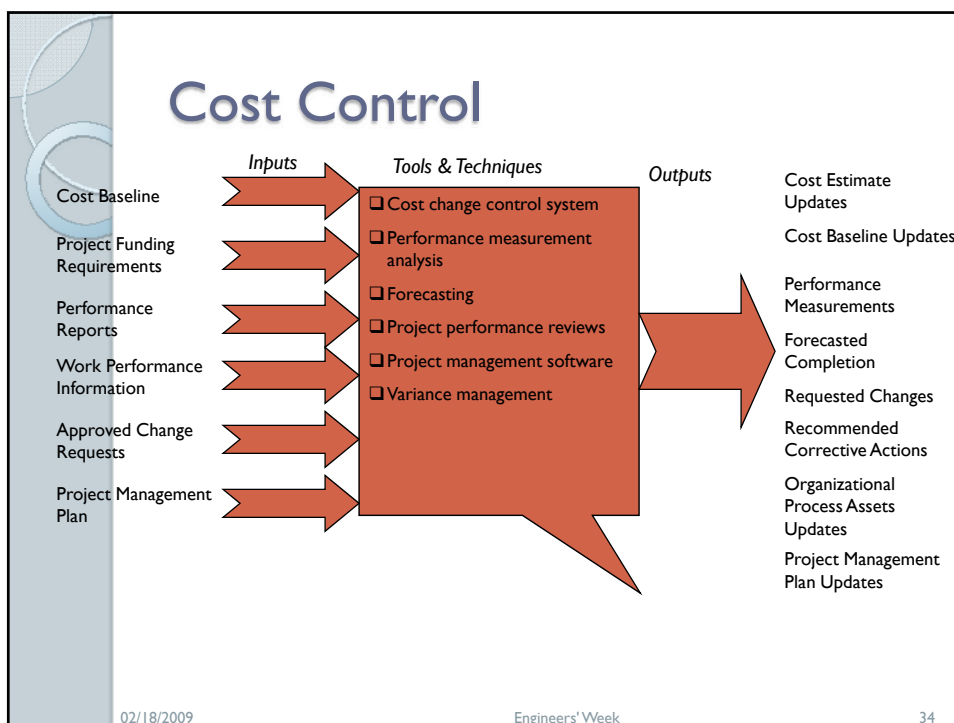
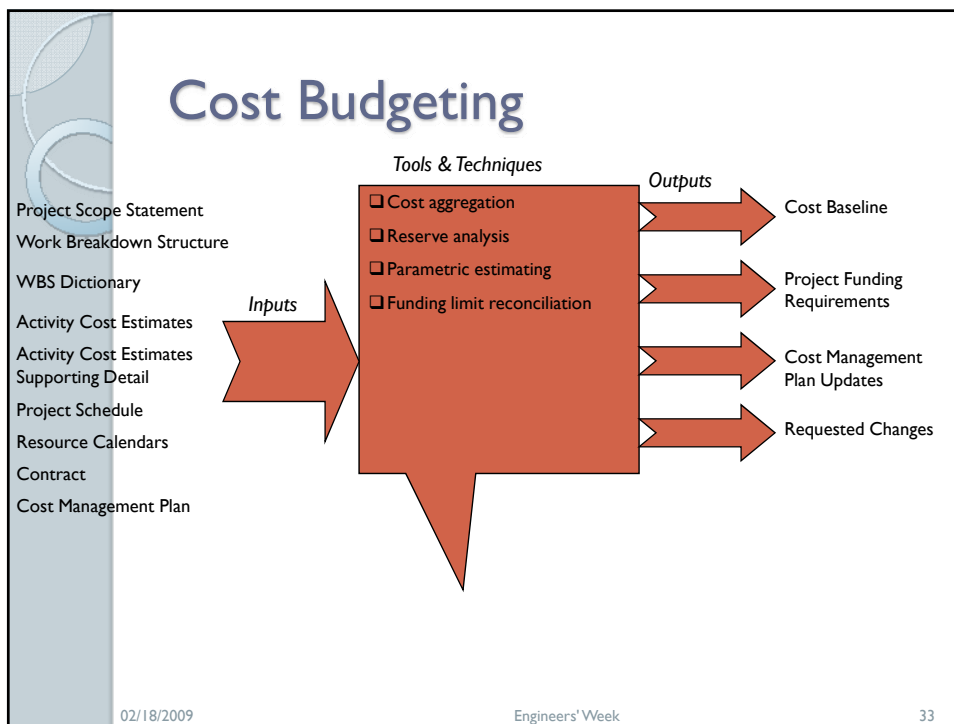
- Three processes
 - Cost Estimating
 - Cost Budgeting
 - Cost Control

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Cost Estimating

<i>Inputs</i>	<i>Tools & Techniques</i>	<i>Outputs</i>
<ul style="list-style-type: none"> Enterprise Environmental Factors Organizational Process Assets Project Scope Statement Work Breakdown Structure WBS Dictionary Project Management Plan <ul style="list-style-type: none"> •Schedule Mgmt Plan •Staffing Mgmt Plan •Risk Register 	<div style="border: 1px solid black; padding: 5px; background-color: #f08080;"> <ul style="list-style-type: none"> <input type="checkbox"/> Analogous estimating <input type="checkbox"/> Determine resource cost rates <input type="checkbox"/> Bottom up estimating <input type="checkbox"/> Parametric estimating <input type="checkbox"/> Project management software <input type="checkbox"/> Vendor bid analysis <input type="checkbox"/> Reserve analysis <input type="checkbox"/> Cost of quality </div>	<ul style="list-style-type: none"> Activity Cost Estimates Activity Cost Estimates Supporting Detail Requested Changes Cost Management Plan Updates

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What Is Project Quality?

- The International Organization for Standardization (ISO) defines **quality** as “the degree to which a set of inherent characteristics fulfills requirements” (ISO9000:2000)
- Other experts define quality based on:
 - **Conformance to requirements:** the project’s processes and products meet written specifications
 - **Fitness for use:** a product can be used as it was intended

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What Is Project Quality Management?

- **Project quality management** ensures that the project will satisfy the needs for which it was undertaken
- Processes include:
 - **Quality planning:** identifying which quality standards are relevant to the project and how to satisfy them
 - **Quality assurance:** periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards
 - **Quality control:** monitoring specific project results to ensure that they comply with the relevant quality standards

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Quality Planning

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome
- Important to prevent defects by:
 - Selecting proper materials
 - Training and indoctrinating people in quality
 - Planning a process that ensures the appropriate outcome

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Who's Responsible for Project Quality?

- Project managers are ultimately responsible for quality management on their projects
- Several organizations and references can help project managers and their teams understand quality
 - International Organization for Standardization (www.iso.org)
 - IEEE (www.ieee.org)

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Quality Assurance

- **Quality assurance** includes all the activities related to satisfying the relevant quality standards for a project
- Another goal of quality assurance is continuous quality improvement
- **Benchmarking** generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization
- A **quality audit** is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects

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Quality Control

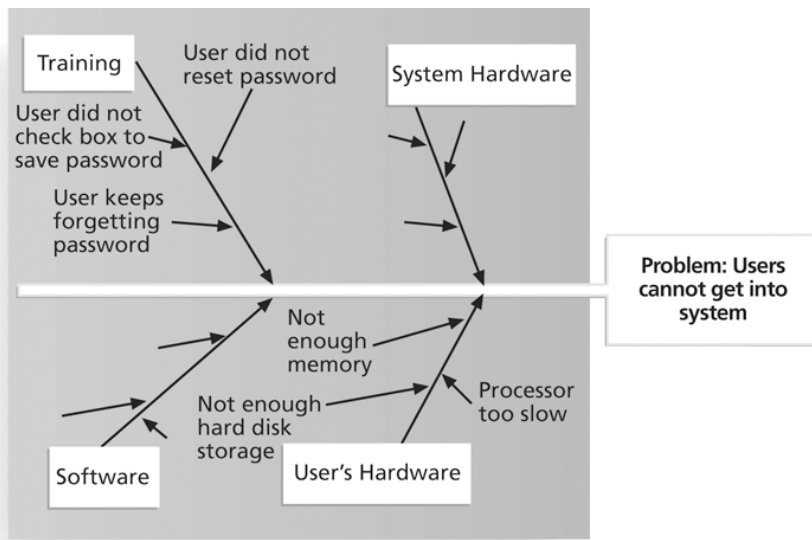
- The main outputs of quality control are:
 - Acceptance decisions
 - Rework
 - Process adjustments
- There are Seven Basic Tools of Quality that help in performing quality control
 - Cause and Effect Diagram
 - Control Chart
 - Run Chart
 - Scatter Diagram
 - Histogram
 - Pareto Chart
 - Flowchart

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Sample Cause-and-Effect Diagram

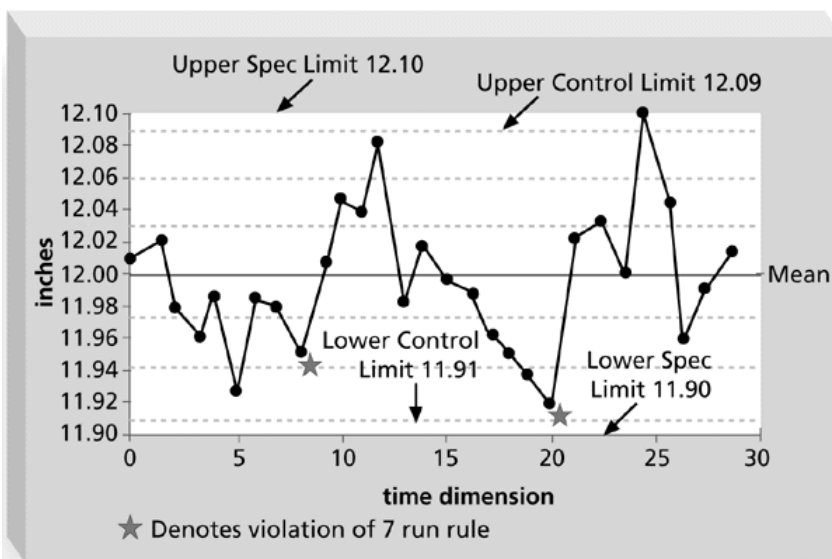


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Sample Quality Control Chart



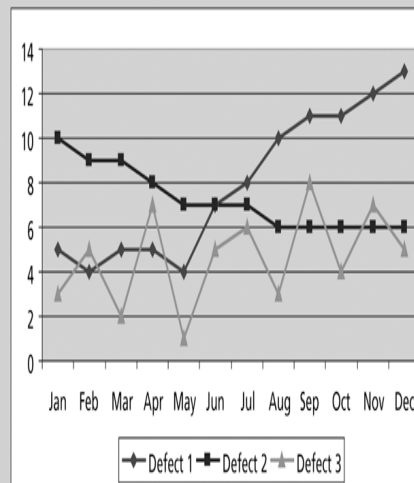
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Run Chart

- A run chart displays the history and pattern of variation of a process over time
- It is a line chart that shows data points plotted in the order in which they occur
- Can be used to perform trend analysis to forecast future outcomes based on historical patterns



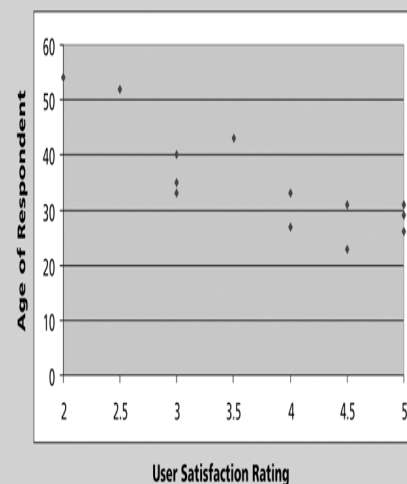
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Scatter Diagram

- A scatter diagram helps to show if there is a relationship between two variables
- The closer data points are to a diagonal line, the more closely the two variables are related



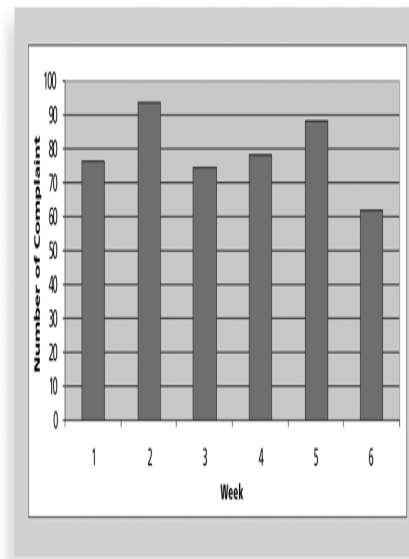
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Histograms

- A **histogram** is a bar graph of a distribution of variables
- Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency



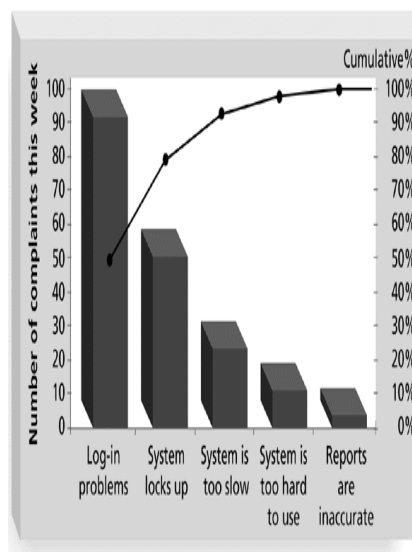
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Pareto Charts

- A **Pareto chart** is a histogram that can help you identify and prioritize problem areas
- **Pareto analysis** is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes



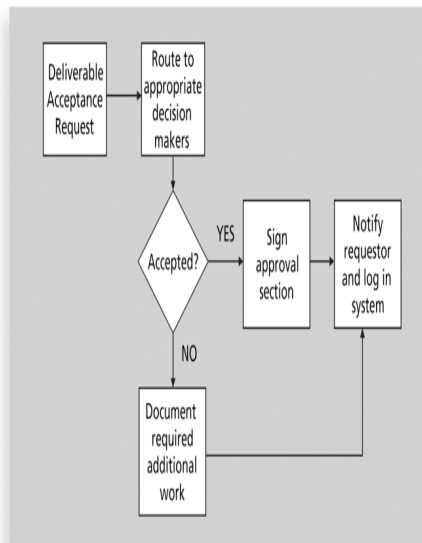
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Flowcharts

- Flowcharts are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved
- They show activities, decision points, and the order of how information is processed



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Statistical Sampling

- **Statistical sampling** involves choosing part of a population of interest for inspection
- The size of a sample depends on how representative you want the sample to be
- Sample size formula:

$$\text{Sample size} = .25 \times (\text{certainty factor}/\text{acceptable error})^2$$
- Be sure to consult with an expert when using statistical analysis

DESIRED CERTAINTY	CERTAINTY FACTOR
95%	1.960
90%	1.645
80%	1.281

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Human Resource Management

- The PMBOK characterizes Human Resource Management as the “processes that organize and manage the project team”:
 - Human Resource Planning
 - The primary HR Planning output is the Staffing Management Plan
 - Acquire Project Team
 - Develop Project Team
 - Manage Project Team

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Human Resource Management

- In project HR Planning, the existing enterprise context must be considered
 - Organizational – How the organizations get along
 - Technical – What types do you need?
 - Interpersonal – The Cultural Question
 - Logistical – Distance between members
 - Political – Private agendas of the mighty

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Human Resource Management

- HR Planning Tools & Techniques
 - Org Charts & Position Descriptions
 - Everyone should be clear regarding who is responsible for what
 - Organizational Breakdown Structure
 - Shows work by functional department / organizational unit
 - Resource Breakdown Structure
 - Shows work by type of resource (useful for project cost accounting)
 - Responsibility Assignment Matrix (RAM)
 - Shows project work by individual; clarifies roles
 - Other Text Formats
 - Position/role descriptions, etc
 - Networking
 - Never underestimate this

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Human Resource Management

- Acquire Project Team is “the process of obtaining the human resources needed to complete the project”
 - Author comment dead on – if the PM is the smartest team member, the PM has failed in recruiting
- If team members aren't pre-assigned, this may require
 - Negotiation skill (influence)
 - The use of Virtual Teams (which in turn will require more focus on Communications)
 - Resolving individual schedule conflicts

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Human Resource Management

- Acquire Project Team uses two primary techniques to accomplish his/her objective of achieving project success without increasing time or cost
 - Resource Loading, or allocating resources to the schedule over specific time periods
 - Resource Leveling, or minimizing period-to-period variations in resource loading via shifting tasks on the calendar using critical path analysis (specifically, float/slack analysis)
- Word of caution: Automated Leveling using PM software often (usually) pushes out completion date

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Human Resource Management

- Develop Project Team is about assuring project performance by improving the members' competencies & interactions
- These activities yield the greatest benefit when done early in the project life cycle, but should not be ignored during the remainder of that cycle
- Important for PM to recognize and respect the group formation cycle
 - Forming, Storming, Norming, Performing, Adjourning

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Human Resource Management

- **Develop Project Team Tools:**
 - General Management Skills (soft skills)
 - Training
 - Formal / On-the-Job
 - Just-in-Time concept important here
 - Delivery methodology should be matched to specific need
 - Team-Building
 - Myers-Briggs,
 - Ground Rule Setting
 - Co-Location (if possible)
 - Recognition & Reward Systems
 - Should be team-based to some extent

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Human Resource Management

- **Manage Project Team “involves tracking team member performance, providing feedback, resolving issues and coordinating changes to enhance project performance”**
- **Deals with the dual-reporting relationships inherent in matrix project structures**

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Human Resource Management

- **One commonly used Manage Project Team Tool is Conflict Management**
 - Project team members should be encouraged to resolve their own conflicts, but the PM is responsible if those conflicts escalate
 - The primary output is Lessons Learned, to lessen the pain for future projects
- **Conflict Management Methods**
 - Problem Solving/Confrontation (usually best)
 - Compromising
 - Smoothing (de-emphasizing differences)
 - Withdrawal (delaying tactic)
 - Forcing (win-lose – last resort)
- **Choice of method should be situational**

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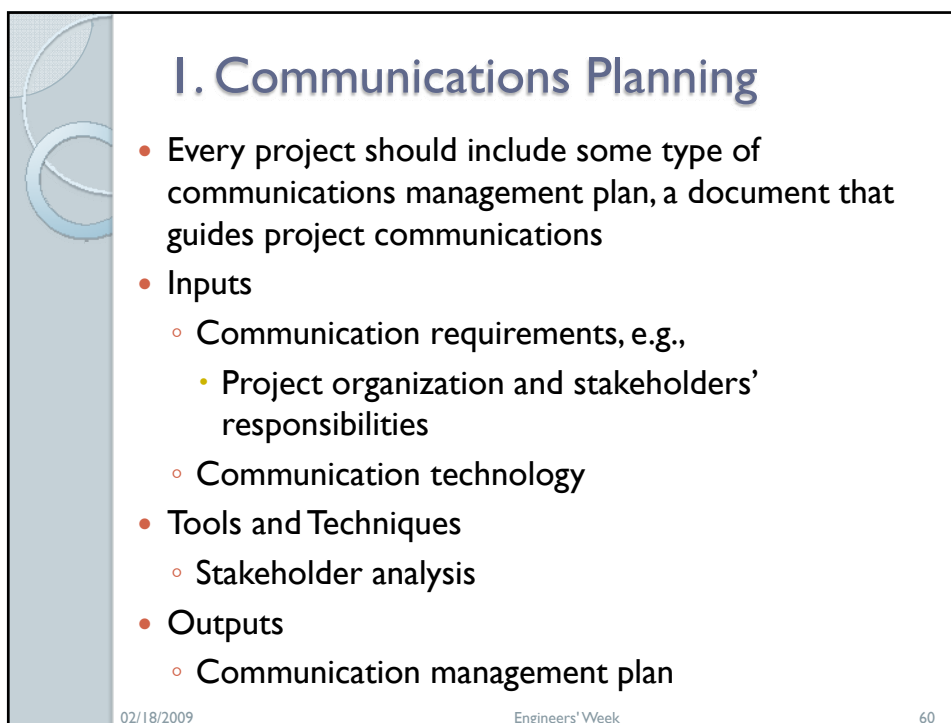
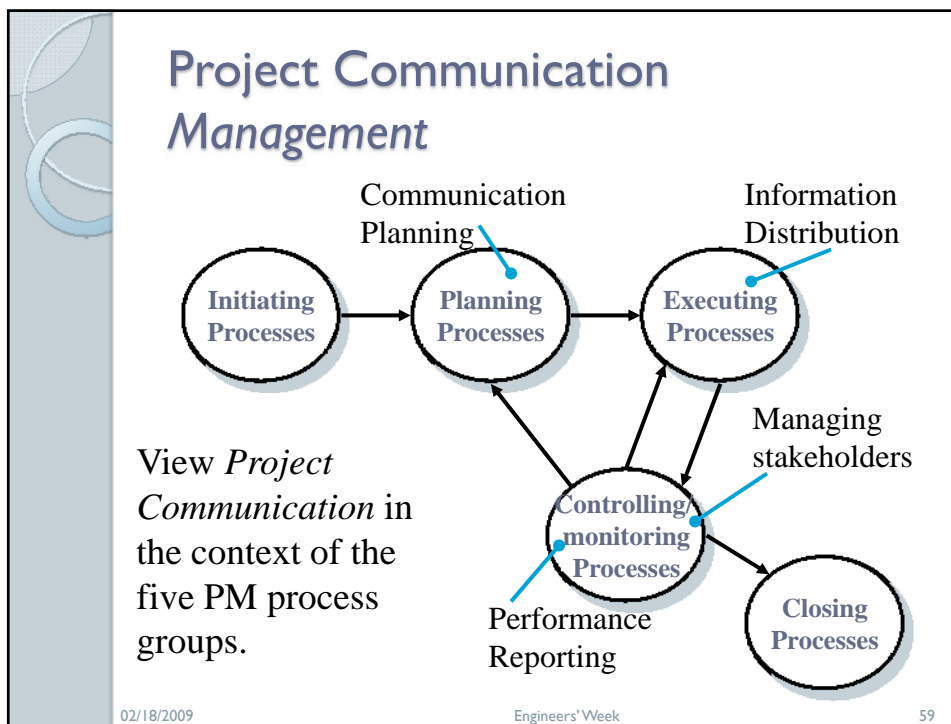
Project Communications Management

- **PROCESSES:**
 - **Communications planning:** determining the information and communications needs of the stakeholders
 - **Information distribution:** making needed information available in a timely manner
 - **Performance reporting:** collecting and disseminating performance information
 - **Managing stakeholders:** Managing communications to satisfy the needs and expectations of project stakeholders and to resolve issues.

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Communications Management Plan

- **Why?** Rational for communicating. Can be derived from stakeholder analysis
- **What?** Project information to communicate
- **When?** Schedule/frequency for communication
- **Who?** Entities responsible for generating, disseminating, receiving the information
- **How?** Method and format for communication
- **Where?** (if location is relevant)

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Stakeholder Analysis

- A stakeholder analysis documents important (often sensitive) information about stakeholders such as
 - stakeholders' names and organizations
 - roles on the project
 - unique facts about stakeholders
 - level of influence and interest in the project
 - suggestions for managing relationships

	Key Stakeholders				
	Ahmed	Susan	Erik	Mirk	David
Organization	Internal senior management	Project team	Project team	Hardware vendor	Project manager for other internal project
Role on project	Sponsor of project and one of the company's founders	DNA sequencing expert	Lead programmer	Supplies some instrument hardware	Competing for company resources
Unique facts	Demanding, likes details, business focus, Stanford MBA	Very smart, Ph.D. in biology, easy to work with, has a toddler	Best programmer I know, weird sense of humor	Start-up company, he knows we can make him rich if this works	Nice guy, one of oldest people at company, has 3 kids in college
Level of interest	Very high	Very high	High	Very high	Low to medium
Level of influence	Very high; can call the shots	Subject matter expert; critical to success	High; hard to replace	Low; other vendors available	Low to medium
Suggestions on managing relationship	Keep informed, let him lead conversations, do as he says and quickly	Make sure she reviews specifications and leads testing; can do some work from home	Keep him happy so he stays; emphasize stock options; likes Mexican food	Give him enough lead time to deliver hardware	He knows his project takes a back seat to this one, but I can learn from him

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2. Information Distribution

- Getting the right **information** to the right **people** at the right **time** and in a useful **format** is just as important as developing the information in the first place
- Project team members are suppliers and customers
 - Suppliers provide inputs
 - Task managers deliver WBS elements
 - Customers receive the products
- Important considerations include
 - **using technology** to enhance information distribution
 - **formal and informal** methods for distributing information

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3. Performance Reporting

- Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives
 - **Status reports**
 - **Progress reports**
 - **Project forecasting**

I. Accomplishments for Month of January (or appropriate month):

- Describe most important accomplishments. Relate to project's Gantt chart.
- Describe other important accomplishments, one bullet for each. If any issues were resolved from the previous month, list them as accomplishments.

II. Plans for February (or following month):

- Describe most important items to be accomplished in the next month. Again, relate to the project's Gantt chart.
- Describe other important items to accomplish, one bullet for each.

III. Issues: Briefly list important issues that surfaced or are still important. Managers hate surprises and want to help the project succeed, so be sure to list issues.

IV. Project Changes (Date and Description): List any approved or requested changes to the project. Include the date of the change and a brief description.

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What Is Risk Management?

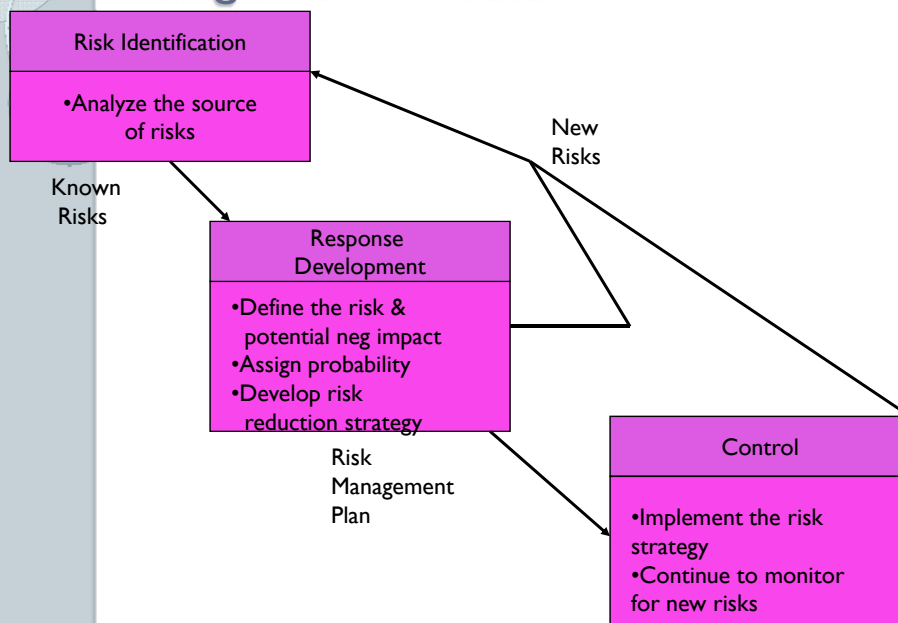
- The means by which uncertainty is systematically identified and managed to increase likelihood of success
- Risk might be obvious:
 - Development of a new drug to treat cancer in a new way
- Or less obvious:
 - Large contract requires execution of 1 or more sub-contractors (how will ensure they will deliver?)
 - Turn-over in industry may result in loss of key people on project
 - Departmental reorganization may disrupt project

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Risk Management Process



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Step I - Identify Risk

- There are 4 techniques to identify risks
 1. Asking stakeholders
 2. Developing a risk profile list
 3. Learning from similar projects
 4. Focus on schedule and budget risk

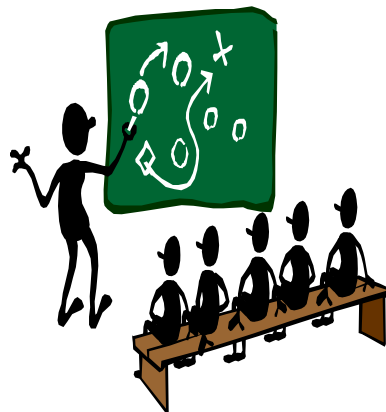
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Step II - Risk Response Strategy

- Not all risks are equally important and/or likely .
- Need a plan that will
 1. *Identify the severity of risk*
 2. *Identify the probability of the risk*
 3. *Develop strategy to deal with the risk*



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Risk Response Strategy

- *Condition* - soil conditions require a complex boring machine
- *Consequence* - Improper use of machine may cause damage
 - Machine damage could be from 50-250K
- *Probabilities*-
 - 75K of equipment damage - 20%
 - 200K of equipment damage - 20%
 - no damage at all 60%
 - Probable cost of damage - 55K
($200 \cdot .2 + 75 \cdot .2 = 55k$)
- *Strategy* - Hire operator from equipment provider for estimated cost of 10K. (any damage by their operator paid by them).
 - Adds 10K to cost of project but reduces possible additional cost and schedule risk

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Step Three: Control

Risk Control - not a 1-shot step

- **Monitor risks like monitor project execution**
 - periodic risk review with Project Board
 - evaluate status of identified risks
 - identify new risks
- **Create a risk control log**
 - Someone responsible for each risk
 - Rank risks by severity
 - Update periodically

Id	P r	Who	Descript	Strategy	Status
7	1	J. Yoa	Design requires O/S not yet released. Vendor has poor track record	1. Get on beta test team. 2. Assess probability of risk by 6/1/01 3. Develop a alt design	1. Beta versions are unpredictable. New release due 6/15/01. RISK HIGH 2. Meeting scheduled 3. Identified alt software. Design will be ready 7/15/01
5	2	T. Chang	All diagrams need to use software tool that is new to tech writers.	1. Send everyone to training 2. TC will complete stds and templates 3. TC will complete Doc mgmt strat	1. Completed. Helped learning curve 2. Completed. Helped effectiveness 3. Trouble will merging old documents. Working with vendor. RISK MED
12	3	T. Smith	Require complex boring machine that we could damage.	Equipment provider will supply operator for 100k	Operator and equip are scheduled. RISK LOW .

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Project Procurement Management Processes

- **Plan Purchases and Acquisitions:** determining what to purchase or acquire, when, and how
- **Plan Contracting:** documenting product requirements and identifying potential sellers
- **Request Seller Responses:** obtaining information, quotations, bids, offers, or proposals as appropriate
- **Select sellers:** reviewing offers and choosing from among potential sellers, and negotiating a written contract with each seller
- **Contract administration:** managing the relationship with the seller
- **Contract close-out:** completion and settlement of the contract

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Plan Purchases and Acquisitions process

- **Inputs**
 - Scope statement
 - WBS and WBS dictionary
 - Project management plan
- **Tools and techniques**
 - Make-or-buy analysis
 - Experts, both internal and external, can provide valuable inputs in procurement decisions
 - Contract type
- **Outputs**
 - Procurement management plan
 - Contract statement/s of work
 - Make or buy decisions

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Procurement management plan

- What the project will buy?
- Who will buy?
 - Assignment of technical responsibilities
 - Assignment of buying responsibilities
- When each buy must happen and when can it be awarded?
- How much will each buy cost?
- What type of contracts will be used?

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Statement of Work (SOW)

- A statement of work is a description of the work required for the procurement
- Many contracts, or mutually binding agreements, include SOWs
- A good SOW gives bidders a better understanding of the buyer's expectations

I.	Scope of Work: Describe the work to be done to detail. Specify the hardware and software involved and the exact nature of the work.
II.	Location of Work: Describe where the work must be performed. Specify the location of hardware and software and where the people must perform the work
III.	Period of Performance: Specify when the work is expected to start and end, working hours, number of hours that can be billed per week, where the work must be performed, and related schedule information.
IV.	Deliverables Schedule: List specific deliverables, describe them in detail, and specify when they are due.
V.	Applicable Standards: Specify any company or industry-specific standards that are relevant to performing the work.
VI.	Acceptance Criteria: Describe how the buyer organization will determine if the work is acceptable.
VII.	Special Requirements: Specify any special requirements such as hardware or software certifications, minimum degree or experience level of personnel, travel requirements, and so on.

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Plan contracting process

- Inputs
 - Procurement management plan
 - Contract SOW
 - Make-or-buy decisions
 - Project management plan
- Tools and techniques
 - Standard forms
 - Expert judgment
- Outputs
 - Procurement documents
 - Evaluation criteria
 - Contract SOW (updates)

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Detailed Criteria for Selecting Suppliers

Criteria	Possible Points	Supplier 1 Points	Supplier 2 Points	Supplier 3 Points
Project manager's educational background and experience	10	8	6	9
Project manager is PMP certified	5	5	0	5
Presentation on management approach	5	4	3	5
Organization's project management methodology	10	7	4	9
Total Score	30	24	13	28

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Project Integration Management Processes

- **Develop the project charter:** working with stakeholders to create the document that formally authorizes a project—the charter
- **Develop the preliminary project scope statement:** working with stakeholders, especially users of the project's products, services, or results, to develop the high-level scope requirements and create a preliminary project scope statement
- **Develop the project management plan:** coordinating all planning efforts to create a consistent, coherent document—the project management plan

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Project Integration Management Processes (continued)

- **Direct and manage project execution:** carrying out the project management plan by performing the activities included in it
- **Monitor and control the project work:** overseeing project work to meet the performance objectives of the project
- **Perform integrated change control:** coordinating changes that affect the project's deliverables and organizational process assets
- **Close the project:** finalizing all project activities to formally close the project

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Org Type - Overview

Project Characteristics	Organizational Structure Type				
	Functional	Matrix			Project
		<i>Weak Matrix</i>	<i>Balanced Matrix</i>	<i>Strong Matrix</i>	
Project manager's authority	Little or none	Limited	Low to Moderate	Moderate to high	High to almost total
Percent of performing organization's personnel assigned full-time to project work	Virtually none	0-25%	15-60%	50-95%	85-100%
Who controls the project budget	Functional manager	Functional manager	Mixed	Project manager	Project manager
Project manager's role	Part-time	Part-time	Full-time	Full-time	Full-time
Common title for project manager's role	Project Coordinator/ Project Leader	Project Coordinator/ Project Leader	Project Manager/ Project Officer	Project Manager/ Program Manager	Project Manager/ Program Manager
Project management administrative staff	Part-time	Part-time	Part-time	Full-time	Full-time

PMBOK® Guide, 2000, 19, and PMBOK® Guide 2004, 28.

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BEST PRACTICES

- Define the project scope in detail and get appropriate approvals
- Get the right people involved
- Estimate the time and costs
- Break the job down
- Identify all project stakeholders and manage expectations
 - Communicate, communicate, communicate!
- Define project management procedures up front
 - Don't make them up as you go

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BEST PRACTICES (Continued)

- Monitor the schedule and budget
- Manage scope via a project Change Control process
 - Have the Project Sponsor approve scope changes
 - Watch out for “scope creep”
- Get deliverable approvals as defined in the Scope document
- Identify risks up front and manage them
- Issues -- identify, escalate, and track
 - Resolve as quickly as possible
- Capture Lessons Learned throughout the project
 - Don't wait until the end of the project

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Project Management Institute

- Founded in 1969
- Over 260,000 member in 170 countries
- <http://www.pmi.org>
- Project Management Professional
 - 3 years exp with bachelors
 - 35 classroom hours
 - 200 question, 4 hour exam
 - Must agree to code of ethics
 - Continuing education requirement

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Credentialing

PMI's credentials and professional development opportunities can help business professionals start, build or advance their careers in project, program and portfolio management.

- **Certified Associates in Project Management (CAPM®)**
- **Project Management Professionals (PMP®)**
- **Program Management Professionals (PgMP)®**
- **PMI Risk Management Professional (PMI-RMPSM)**
- **PMI Scheduling Professional (PMI-SPSM)**

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Project Management: Summary

Project Management Body of Knowledge

- *Functions*
- *Tools and Techniques*

Certification Process

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