**PMP Training 2.18.2014**

**PROJECT** **(P.U.T.)**

* Subject to **Progressive Elaboration**
  + High level, as project progresses, more definitive
  + Working in steps
* **Unique** in results, services or product
* **Temporary** with a start and finish

**PROJECT MANAGER**

* The person who leads, manages, controls the project.

**PROJECT MANAGEMENT**

* The application of knowledge, skills, tools and techniques to project activities in order to meet project objectives

**PROGRAM MANAGEMENT**

* A strategic tool, it is the **coordinated management** of a group of projects that are **interrelated** and or **interdependent** and contribute to a common strategic objective
  + Allows you to leverage resources
  + Gives you the ability to obtain benefits and control not available from managing the projects separately
* **Project** is a house
* **Program** is a subdivision
* **Portfolio** is a town

*Ex. Building a single house vs. building an entire subdivision*

**PORTFOLIO MANAGEMENT**

* A portfolio is the totality of all of the organizations programs, projects and related operational activities.

**OPERATIONS**

* Ongoing activities that supports the business

**PROJECT MANAGEMENT OFFICE (PMO)**

* The PMO can become the **“Center of Excellence”** for project management, the **overseeing body** for all project activity, and the body to which Project Managers report.

**PROJECT MANAGEMENT METHODOLOGY (NEED TO TYPE IN SLIDES 11-12)**

* A collection of policies, procedures, guidelines, templates and mandatory items which define how projects should be: **Planned**, **Monitored** and **Controlled** within an organization.

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**ORGANIZATIONAL STRUCTURES**

* **Functional** – All about the Functional Manager
* **Matrix** – About a balance
* **Projectized** – All about the Project Manager
* **Composite** – Combination of any of the above

*NOTE: The greatest conflict on a project happens between the Functional Manager (has the resources) and the Project Manager (timeline, no resources).*

**IN A FUNCTIONAL ORGANIZATION:**

* Functional Manager (FM) has more authority than the Project Manager
* Project Manager (PM) is an expediter with no authority
* Project Manager is not fully dedicated, but more “part time”

**IN A MATRIX ORGANIZATION:**

**Weak:** FM = More authority than PM

PM = Expediter with no authority **OR**

PM = Coordinator with little authority

PM = Committed to project part time

**Balance:** FM and PM share responsibility

**Strong:**  PM = More authority than FM

PM = Committed to project full time

**IN A PROJECTIZED ORGANIZATION:**

PM = ALL authority, do not obtain approvals, decision-making capability

PM = Committed to project full time

*\*At the end of the project, there is no home for the project team*

**IN A COMPOSITE ORGANIZATION:**

* Combination of any of the organizations above

*NOTE: Performance Review of project team is responsibility of Functional Manager EXCEPT in Projectized*

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**ORGANIZATIONAL PROCESS ASSETS (OPA)**

* Consists of all the **methods, standards, policies, procedures, rules, templates, software tools, database project information, previous project plans, and estimating data** that exist to guide and mandate project execution.
* Also included is the **knowledge base** of **historical project files** and **lessons learned** and accumulated skill and knowledge of individual employees.

**ENTERPRISE ENVIRONMENTAL FACTORS (EEF)**

* Project takes place within a “context” or “Environment” NOT a vacuum
  + Company Organization Structures (Functional, Matrix, Projectized, Composite)
  + Corporate Culture
  + Values/Work Ethics
  + Laws/Regulations
  + Marketplace
  + Risk Appetite
  + Company methodology and organization
  + Company culture
  + Company Infrastructure and capability
* Some Enterprise Environmental factors are within the control of project personnel—most are not
* Some factors are external to the organization
  + National and global economic situation
  + Government and industry standards and regulations
  + The competition
  + Supplier Behavior

*NOTE: Both OPAs and EEFs are CONSTRAINTS for your project*

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**STAKEHOLDERS (thermostat)**

* Stakeholders exert influence over the project
  + Anyone that is working on the project
  + Anyone that will be negatively or positively affected/impacted by a project
    - Project Manager (PM) - Responsible for outcome of the project
    - Functional Manager (FM) - Responsible for different departments
    - Operational Manager (OM) - Responsible for Day to Day activities
    - Customer - Individual that will acquire
    - User - The person that literally uses end results
    - $ponsor - Supplies resources

*NOTE: - There are cases where the customer and the user are the same.*

*- Any question with a customer AND a user—they are TWO different individuals.*

*- According to PMI, a PM can only manage* ***ONE*** *project at a time.*

*- It is the responsibility of the PM to identify ALL stakeholders.*

*- It is the responsibility of the PM to favor the customer whenever a conflict amongst stakeholders arises.*

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**PROJECT TEAMS (everybody)**

Project Manager Final Outcome

Project Management Team Supports Project Manager

Team Members Execute

**PM (head coach) 🡪PM TEAM (def. coach) 🡪PROJECT TEAM (includes team members)**

*NOTE: - At no time does the head coach switch places with the executors (team members)*

*- The PM spends majority of time planning (there is no execution until planning)*

*- PLANNING ALWAYS HAPPENS BEFORE EXECUTION, PM IS NEVER THE EXECUTOR*

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**PHASE**

* All of the activities needed to be executed in order to produce a deliverable
* Every **phase** produces a deliverable.
* A **deliverable** is:
  + An end result
  + Unique
  + Can be verified

**EVERY PHASE MUST GO THROUGH 5 PROCESS GROUPS (IPECC):**

**I**nitiated

**P**lanned Project Manager

**E**xecuted Team Members

**M**onitored& **C**ontrolled

**C**losed

*NOTE: NOTHING HAPPENS UNTIL IT IS PLANNED (by Project Manager usually)*

**MANAGEMENT REVIEW**

At the end of every phase is a **MANAGEMENT REVIEW.**

* The purpose of the management review is to assess whether the activities in each phase have been completed as IPECC to produce a deliverable.
* To gain approval to move to the next phase.
* Opportunity to terminate.
* *AKA:*
  + *Phase Gate*
  + *Toll Gate*
  + *Decision Gate*
  + *Kill point*
  + *Phase Exit*
  + *Milestone*

**PHASE TO PHASE RELATIONSHIPS** **(I.S.O.)**

* Iterative
* Sequential
* Overlapping

**PROJECT MANAGEMENT LIFE CYLE is 47 process and 5 Project Management Process Groups**

**INTEGRATION MANAGEMENT**

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Processes and activities needed to identify, define, combine, unify and coordinate the processes and project management activities within the various Process Groups.

**PROCESS**

* Inputs
  + “Must Haves,” Raw Materials
* Tools/Techniques
  + Verbs/Actions applied to inputs that produce outputs
* Outputs
  + Results of tools/techniques applied to inputs

**“STAMPED” – Tools/Techniques in Process**

* **S**ystem
* **T**echnique
* **A**udit/Analysis
* **M**ethod
* **P**rocedure
* **E**xpert Judgment
* **D**ecomposition

**“ING”**

**DEVELOP PROJECT CHARTER**

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A Project Charter is what gives the project its formal approval. It gives the project its reason for existing. It is somewhat a “birth certificate” for a project.

* It formally authorizes the project
* It formally names the PM and provides the PM’s authority
* It provides a defined start and established boundaries by Sr. Mgmt to formally accept and commit to the effort
* Happens at the beginning of the Project Life Cycle – before any substantial planning
* Project Charter should indicate what the project purpose is or the project justification
* It should list some measureable objectives and related success criteria
* Should have within it a summary budget
* Should have a summary milestone
* Should have high level requirements
* There should be a high level project description
* There should be contained within it some type of product characteristics

*NOTE: - According to PMI, every project should have a Project Charter. If it doesn’t, ask the PM for one.*

*- Any time you see the word “Develop” in a process, the final outcome/deliverable will be what comes right behind the word “Develop”. (ex. Develop a Project Charter, Project Charter is the outcome)*

***Keywords: Authorize, High Level (dealing with a project charter)***

**Inputs:**

* Project Statement of Work (SOW)
* Business Case
* Agreements

**TOOLS AND TECHNIQUES**

* Expert Judgment

**OUTPUTS**

* Project Charter

**The Project Charter**

* + Names the Project Manager
  + Gives the project a “Green Light” to proceed
  + Is based on a need which should be clearly explained

**An SOW describes (ADT)**

* + **A**ctivities
  + **D**eliverables
  + **T**imescale

**An SOW references (BPS)**

* + **B**usiness Need
  + **P**roduct Scope Description
  + **S**trategic Plan

**Business Case**

* Customer Request
* Market Demand of Business Need
* Technological Advance
* Legal Requirement on Ecological Impact
* Social Need

Therefore the purpose of the Business Case is to demonstrate why a project is viable in its own right and why it should be favored over others.

*Project Charter*

*Statement of Work*

*Expert Judgment*

*Agreements pg. 37 (only comes into play for external engagement)—In all cases they are used to establish the* ***Legal Framework*** *in which the project is to be conducted.*

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**FACILITATION TECHNIQUES**

* Brainstorming
* Conflict resolution
* Problem Solving
* Meeting Management

*NOTE: ALWAYS A TOOL/TECHNIQUE, NEVER AN INPUT OR OUTPUT*

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**PROJECT MANAGEMENT PLAN (ALL PLANS AND ALL BASELINES)**

* A single, cohesive guide to project execution (Playbook)
* Starts early in the Project Life Cycle but can’t be finished until key Outputs of other processes are complete (think Austin Migration plan with Kristi McGee)

***Keywords: “How To,” Approach,***

***Baseline – All original plans plus or minus any approved changes (removing a play from the playbook)***

*NOTE: To ensure “buy-in,” the PMP should be developed with the input of ALL relevant approved stakeholders and the project team.*

**DEVELOP A PROJECT MANAGEMENT PLAN**

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**Inputs:**

* Project Charter
* Outputs from Other Processes (subsidiary plans)

**TOOLS AND TECHNIQUES**

* Expert Judgment
* Facilitation Techniques

**OUTPUTS**

* Project Management Plan—The MOST IMPORTANT project document
  + It guides the team in execution, monitoring and control of project
  + Aids stakeholder understanding by communicating the team’s intentions

**DIRECT AND MANAGE PROJECT WORK**

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*KEYWORDS: Implements, work, build, do.* ***This is where the WORK gets done.***

**What’s the purpose?**

Lead the project team in performing the work as detailed in the PMP including implementation of approved changes.

**How does it help?**

Provide the project with the leadership and overall project management expertise required to perform the work of the project.

**When does it happen?**

Throughout the entire Project Life Cycle

**Inputs:**

* Project Management Plan
* Approved Change Requests

**TOOLS AND TECHNIQUES**

* Facilitation Techniques
* Project Management Information Systems
* Meetings

**OUTPUTS**

* Deliverables
* Work Performance Data
* Change Requests

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**Approved Change Requests (Dr. CPR)**

* An Output of the Perform Integrated Change Control process where they were reviewed/approved by the Change Control Board (CCB) but implemented here, in the Directed and Manage Project Work process
* May Include the implementation of **(Dr. CPR)**
  + Defect Repair – Flaw in deliverable found by customer’s hands (outside of project team)
  + Corrective Actions (“Re-work”) – Wall painted the wrong color
  + Preventive Actions (“Proactive”) – Tell the painter to make sure the wall is painted the right color
  + Request – A simple ask for a change
* All changes whether approved or rejected are updated in a Change Log.

***NOTE: Any stakeholder can request a change request.***

***NOTE: Risk is anything that is unknown or uncertain.***

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**Project Management Information System (PMIs)**

Tools, procedures and processes used for collecting, collating, and disseminating information generated by project management processes, including integrated tools for scheduled control, configuration management, information collection and distribution and document management and control.

The **Project Management Information System (PMIS) (Microsoft Project, etc)** is also referred to as **Information Management.**

**Work Authorization Systems (WAS)**

* Right Work
* Right Time
* Right Sequence

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**Meetings (BIDs)**

* **B**rainstorming, Option Evaluation, Design
* **I**nformation Exchange
* **D**ecision-Making

Meetings can be Face to Face or Virtual.

**Work Performance Data (WPD) – is an output of Direct & Manage Project Work — Information about current unfinished deliverable**

* Raw Data
* Incomplete Work
* Work in Progress
* Status

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**Flow of Deliverables**

Direct & Manage Project Work🡪Deliverables

**Control Quality Validate Scope Close Project or Phase**

Input: Input: Input:

Deliverables Verified Deliverables Accepted Deliverables

🡪 🡪

Output: Output: Output:

Verified Deliverables Accepted Deliverables Transitioned Deliverables

**Scope** is the work and only the work to produce the deliverable. (You don’t work on the grill to make an iced coffee)

*NOTE: Anytime you hear the word* ***inspection****, it always involves the customer.*

**MONITOR AND CONTROL PROJECT WORK**

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* Track, review and report the progress made in meeting the performance objectives detailed in the PMP
* Stakeholders are enabled to understand current project status, along with scope, time, and budget forecasts
* Happens through the entire Project Life Cycle
* Comparing the result of actual work to the PMP
* Assessing need for corrective or preventative actions
* Collecting information for status reporting

**Inputs:**

* Project Management Plan
* Work Performance Information
  + WPD gives you the ability to have WPI (did we make iced coffee?)—It is WPD analyzed or compared to the PMP

**TOOLS AND TECHNIQUES**

* Project Management Information Systems (Microsoft Project—the tool)
* Meetings

**OUTPUTS**

* Change Requests (Dr. CPR)
* Work Performance Reports—presentation format to be communicated to stakeholders
* Project Management Updates

***NOTE: WPD becomes WPI becomes WPR***

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***Validated Changes***

*Note that such changes will have already passed through the Perform Integrated Change Control process*

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***Analytical Techniques***

* *Any technique used to predict conceivable outcomes based on potential variations of project or environmental variables and their relationships with other variables.*
* *Analysis that is either structured or unstructured to aid in the understanding of root causes to spot trends and to aid in forecasting.*

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***Work Performance Reports***

* *The representation of Work Performance Information compiled in project documents intended to generate decisions, actions, awareness.*

**PERFORM INTEGRATED CHANGE CONTROL: A Clearing House for All Changes**

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**What is the purpose?**

* Review change request; approve/reject such requests; and manage approved changes.

**How does it help?**

* Allows for approved, documented changes to be considered in an integrated and organized manner.

**When does it happen?**

* Throughout the entire Project Life Cycle

***Change control is always a formal process.***

* ***Gold Plating is strictly prohibited by PMI.***
  + *Gold Plating is any unapproved changes that are made to the project.*

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**Inputs:**

* Project Management Plan
* Work Performance Reports
* Change Requests

**TOOLS AND TECHNIQUES**

* Meetings
* Change Control Tools

**OUTPUTS**

* Approved Change Requests (Dr. CPR)
* Change Logs
* Project Management Updates

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**Change Control Tools—Any tool that is used to manage the change request**

* Manual or Automated
* Used to facilitate Configuration Management and Change Management

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**Approved Change Requests**

* An Output of this process, Perform Integrated Change Control—where they are reviewed/approved by the Change Control Board but an Input to the Direct & Manage Project Work Process (where the ONLY place work is physically done).

**Change Log:**

* All change requests and their disposition of approved or rejected are documented in the change log.

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**Change Control Board:**

* On large projects, should always be a formal Change Control Board to approve or deny change requests
* For smaller projects, this may be an unacceptable overhead and may be made by PM Sponsor or Stakeholders

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**Acceptable reasons for changes:**

* External events triggered by regulators, competitors, marketplace
* Risks or issues which affect the project’s scope, timescales, costs, quality or benefits
* Improvements to products or processes
* Priority changes
* New information

**Unacceptable reasons for changes:**

* Inadequate requirements gathering
* Poor project definition
* Ineffective Stakeholder Management
* Unrealistic Estimates

*NOTE: Project Manager has responsibility of identifying ALL stakeholders. Also responsible for ensuring that ALL requirements are captured. ALL requirements may not be explicitly stated—but it is still the responsibility of the PM for identifying all risk and managing risk. Any time there are differences amongst stakeholders, the PM must ensure the customer is favored. The PM is responsible for resolving all conflict. PM is Ultimately responsible for final outcome of project.*

**CLOSE PROJECT OR PHASE**

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***KEYWORDS:***

* *FINISH*
* *COMPLETE*
* *FINALIZE*
* *TERMINATE*
* *CANCEL*
* *END*

**What’s the purpose:**

* To finalize the project activities of all Process Groups to complete the project or phase in an organized, formal manner.

**How does it help:**

* In addition to formally marking the end of project work, it also provides the opportunity to document lessons learned and orchestrate the release of resources.

**Happens at the end of a completed phase or at the end of a project.**

**AKA: Administrative Closure.** The very last thing you want to do is release resources.

This is needed b/c you want to close every project as permanently and as neatly as possible.

*NOTE: In early termination, always document the extent to which the deliverables were completed and where the project was.*

**Inputs:**

* Project Management Plan
* Accepted Deliverable

**TOOLS AND TECHNIQUES**

* Expert Judgment

**OUTPUTS**

* Final Product, Service or Result Transition
* Updates to Organizational Process Assets

*NOTE: In a project we want to get the objectives and close.*

*NOTE: The $ponsor ISSUES a project charter.*

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**STAKEHOLDER MANAGEMENT:**

Processes required to identify the individuals or groups that could affect or be effected by the project: to analyze their expectations and potential impact and develop strategies that would ENGAGE them.

Stakeholders must be managed CLOSELY

**Identify Stakeholders**

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**When?**

* As early in the Project Life Cycle as possible, and throughout the life of the project if necessary.
* Stakeholders may change from phase to phase (add, delete, change)
* Stakeholder management is all about relationship—keeping them engaged in every phase they are relative to and throughout the project

*NOTE: When you have the word “Identify” the outcome will be a Register.*

**Purpose**

Identify the individuals or groups that could impact the project or be impacted by the project, analyze key characteristics of these individuals or groups, and the document the results in a stakeholder register

**Stakeholder Register**

* For PM’s eyes only.
* May have information you do not want to share with the rest of the Project Team

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**Inputs:**

* Project Charter
* Procurement Documents/Agreements (Engage outside of project team)

**TOOLS AND TECHNIQUES**

* Stakeholder Analysis

**OUTPUTS**

* Stakeholder Register

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**Stakeholder Analysis**

* Identify stakeholder’s interest, influence and expectations and relate them to the purpose of the project
* Are they interested in the project succeeding?
* Will they benefit from the success of the project?
* Will they openly support the project or not?

**Stakeholder Analysis is a three step activity:**

* **Identify**
  + Key Stakeholders usually easy to identify: anyone in a decision making or management role who is impacted by the project outcome: Project Sponsor Project Manager, Customer.
* **Analyze**
  + Analyze the potential impact or support each stakeholder could generate and classify them in order to define an approach strategy If many stakeholders, important to prioritize the stakeholders.
* **Assess**
  + Assess how key stakeholders are likely to react or respond in various situations in order to plan how to influence them to enhance support and mitigate potential negative impacts.

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**Classification Models**

**Power:** Level of Authority

**Interest:** Level or Concern

**Influence:** Active Involvement

**Impact:** Ability to change

**Salience:** Venn Diagram (#3)

**Power/Interest Grid**

**Power/Influence Grid**

**Influence/Impact Grid**

**Salience Model**

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**Champion**—Powerful person actively supportive

**Blockers**—Powerful actively resist the project

**Supporters**—People with little power in favor of project

**Detractor**—People with little power against the project

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**Stakeholder Register:**

* Identification Information
* Assessment Information
* Stakeholder Classifications

**Plan Stakeholder Management**

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* Stakeholder Management is the PM’s responsibility.
* Communication is key.
* Should be a planned proactive process, not reactive.

**Purpose?**

* Develop and document in the stakeholder management plan, appropriate strategies for engaging Stakeholders.

**When?**

* AFTER Stakeholder Register has been developed, and thereafter during the entire Project Life Cycle, as needed.

**Inputs:**

* Project Management Plan
* Stakeholder Register

**TOOLS AND TECHNIQUES**

* Analytical Techniques

**OUTPUTS**

* Stakeholder Management Plan

*NOTES:*

* *Develop=Whatever you’re developing*
* *Identify=Register*
* *Plan=Plan*

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**Analytical Techniques**

* *Any technique used to predict conceivable outcomes based on potential variations of project or environmental variables and their relationships with other variables.*
* *Analysis that is either structured or unstructured to aid in the understanding of root causes to spot trends and to aid in forecasting.*

**Engagement Level Classified as follows:**

**Unaware** Unaware of project and potential impacts

**Resistant** Aware of project and potential impacts and resistant to change

**Neutral** Aware of project yet neither supportive nor resistant

**Supportive** Aware of project and potential impacts and supportive to change

**Leading** Aware of project and potential impacts and actively engaged in ensuring the project is a success

Current/Desire Matrix (all about managing relationships)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Who/Classification** | **Unaware** | **Resistant** | **Neutral** | **Supportive** | **Leading** |
| **Judy** |  | Current |  | Desired |  |
| **Sam** |  |  |  | Current/Desired |  |

**Managing Stakeholder Engagement**

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**Purpose:** Interact with Stakeholders to meet their needs and expectations, address their issues and implement planned Stakeholder engagement strategies in the project’s activities.

**When:** After BOTH the stakeholder management plan and the Communications management plan have been developed.

Engage stakeholders to gain commitment, address their concerns, and resolve issues.

**Inputs:**

* Stakeholder Management Plan

**TOOLS AND TECHNIQUES (MCI)**

* Management Skills
* Communication Methods
* Interpersonal Skills

**OUTPUTS**

* Issue Log
* Change Requests
* PMP Updates
* Project Document Updates
* OPA (Organizational Process Assets) Updates

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**Communication Methods**

* Which of these identified methods are to be used on the project
* When they will be used
* How they will be used

**Interpersonal Skills**

* Building Trust
* Resolving Conflict
* Active Listening
* Overcoming Resistance to Change

**Management Skills**

* **Coordinate and harmonize the group**
* Facilitating Consensus toward project objectives
* Influencing people to support the project
* Negotiating agreements to satisfy project needs
* Modifying organizational behavior to accept the project outcome

**Issue Log**

* Used to document and monitor the resolution of issues
* Documents who is responsible for the resolving issues, as well as resolution due date
* Valuable input to the Manage Project Team and Control Communications processes

**Control Stakeholder Engagement (Did we do what we said we were going to do?)**

**Purpose?**

Monitor Stakeholder Relationships, in general and revise strategies and Stakeholder engagement plans as needed.

**When?**

AFTER stakeholders have been identified and Stakeholder engagement plans have been made and the project is underway—and it continues through the Project Life Cycle.

**INPUTS**

* Project Management Plan
* Issue Log
* Work Performance Data (WPD)

**TOOLS AND TECHNIQUES**

* Information System

**OUTPUTS**

* Work Performance Information (WPI—attained by comparing WPD to PMP)
* Change Request
* OPA Updates (Organizational Process Assets)
* PMP (Project Management Plan) Updates

*NOTE: Monitoring and Control Acronym—COP. Cops control—they always want your information.*

* ***C****hange Request*
* ***O****PA updates*
* ***P****roject Management Plan Updates*

**Scope Management**

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**The processes required to ensure that the project includes ALL of the work and ONLY the work that is required to successfully complete the project.**

**Plan Scope Management**

**Purpose:**

Produce the scope management plan—a document that explains how the project scope will be defined, validated and controlled.

**When?**

After Project Charter has been developed but before collect requirements process.

**INPUTS**

* Project Management Plan
* Project Charter

**TOOLS AND TECHNIQUES**

* Meetings
* Expert Judgment

**OUTPUTS**

* Scope Management Plan
* Requirements Management Plan

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***Scope Management Plan***

* *A “How To” subsidiary management plan that BECOMES part of the Project Management Plan.*
* *Describes all the management activities planned by the team regarding the scope:*
  + *Definition*
  + *Development*
  + *Monitoring*
  + *Control*
  + *Verification*
* How formal acceptance of deliverables will be obtained from the Customer
* How Requests for Changes to the scope will be managed
* How subsequent Processes in the Scope management area will be conducted
* How other scope documents—such as the Scope Statement and the Work Breakdown Structure WBS will be developed

**Requirements Management Plan**

* Describes how requirements will be analyzed, documented, managed
  + Planning, Tracking, Reporting of requirements and changes to product activities
  + Requirements Prioritization process
  + Product Metrics that will be used
  + Traceability Structure that reflects which attributes will be displayed in the *Requirements Traceability Matrix*

**Collect Requirements**

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**Purpose?**

Determine and document—in the Requirements Documentation—the Stakeholders’ needs and requirements in order to meet the objectives of the project.

**When?**

AFTER Plan Scope management process but BEFORE Define Scope process.

**INPUTS**

* Requirements Management Plan
* Stakeholder Management Plan
* Stakeholder Register

**TOOLS AND TECHNIQUES**

* Focus Groups
* Facilitated Workshops
* Group Creativity Techniques
* Group Decision Making Techniques
* Prototype

**OUTPUTS**

* Requirements Documentation
* Requirements Traceability Matrix

**Stakeholder Management Plan**

* Includes the strategies developed in this process designed to engage stakeholder effectively
* Contents of plan may include
  + Current and desired engagement levels

***Focus Groups***

*Expectations and attitudes of key Stakeholders and subject matter experts, regarding the deliverables are gathered in a group setting with a trained moderator leading the group through a discussion*

***Facilitated Workshops***

*In the workshop setting, issues may be revealed and resolved more quickly than in individual sessions*

***Joint Application Design/Development (JAD)***

* *Brings Developers and Users together to talk about product characteristics*
* *Commonly used in the software development industry, business subject matter experts and development team gathered to focus on software development process improvements.*

***Quality Function Development (QFD)—(VOC happens DURING QFD)***

*Common in manufacturing, QFD is used to identify major new product characteristics. Customer needs are first collected—a process known as Voice of the Customer (VOC) and then sorted and prioritized. QFD are Facilitated Workshops*

***Group Creativity Techniques***

* ***Brainstorming***
  + *Used to generate and compile ideas regarding the requirements (of both project and product)*
* ***Nominal Group Technique***
  + *Brainstorming with a voting process that ranks or prioritizes ideas*
* ***Affinity Diagram***
  + *Used to classify and group ideas for further review and analysis. Appropriate for large numbers of ideas (sticky pads—group)*

***Group Decision Making Techniques***

*Techniques that generate, classify and prioritize requirements.*

***Unanimity***

*ALL participants are in agreement. One way is by Delphi Technique—experts respond anonymously to facilitator’s questions and the ideas or requirements held in common are identified.*

***Majority***

*More than 50% of the group agree.*

***Plurality***

*The decision made, option advocated, or view held by the largest block within the group prevails. Useful only when the # of decisions is more than two.*

***DUMP—Group Decision Making Techniques***

***D****ictatorship*

***U****nanimity*

***M****ajority*

***P****lurality*

***Observations***

*Also known as “job shadowing” this technique is useful where processes are detailed or users find it difficult to communicate their needs.*

***Prototypes***

*Working model of the desired product enables hands-on experience that may yield information not available from abstract discussion*

***Requirements Documentation***

* *Requirements must be complete, consistent, unambiguous, traceable and acceptable to key stakeholders.*
* *Documentation may include business solutions, project stakeholder, and transition requirements as well as assumptions (see RISK below)/constraints.*

***Requirements Traceability Matrix***

* *Matrix that provides traceable links for each requirements from their respective origins to the deliverables that satisfy them*

***Assumptions (RISK-uncertain or unknown)***

* *Anything thought to be true, but has not been validated*

**Define Scope**

**PAGE 103**

**Converting Requirements into Scope**

**Purpose?**

Produce the Project Scope Statement, a detailed description of both the product and the project.

**When?**

AFTER Collect Requirements process and BEFORE create Work Breakdown Structure

*NOTE: Scope Statement should have listed within it bare minimum:*

* *Constraints*
* *All Assumptions*
* *Acceptance Criteria*
* *Exclusions*
* *Deliverables*
* *Product Scope Description*

*LEVEL OF DETAIL IS HIGHER IN SCOPE vs PMP vs PROJECT CHARTER*

Triple Constraint

SCOPE

TIME

COST

The last process of Scope/Time/Cost creates **Baselines**

**INPUTS**

* Scope Management Plan
* Requirements Documentation

**TOOLS AND TECHNIQUES**

* Product Analysis
* Alternatives Generation

**OUTPUTS**

* Product Scope Statement

***Product Analysis***

*Comprised of various methods devised to help translate product descriptions at a summary level into deliverables*

***Alternatives Generation***

*The goal of this technique is to develop multiple options in identifying different approaches to perform project work*

***Product Scope Statement***

* *A detailed description of both project and product—the scope, major deliverables assumptions and constraints.*
* *It is critical to project success! First step towards creating a WBS and Project schedule.*
* *Content includes:*
  + *Description of Product Scope with particular focus on deliverables*
  + *Acceptance Criteria*
  + *Exclusions/Assumptions/Constraints*

**Create WBS**

**PAGE 109**

**Purpose?**

Produce the Work Breakdown Structure (WBS)—a graphical subdivision of project deliverables—beginning with Scope Statement into smaller, more manageable components.

**When?**

AFTER Define Scope process and BEFORE Time Management Process

**INPUTS**

***KEYWORDS for Creating a WBS***

*Control Account (or Control Point)*

*Work Packages*

*Breakdown*

* Project Scope Statement
* Requirements Documentation

**TOOLS AND TECHNIQUES**

* Decomposition

**OUTPUTS**

* Scope Baseline

***Decomposition***

* *A breaking down of the processes*
* *Lowest level is known as Work Package level (deliverable)*
  + *Work Packages are manageable units of work that can be planned, budgeted, scheduled and controlled as individual entities.*
  + *Useful rule of thumb is 80 Rule: A work package should generally be no more than 80 hours effort (Heuristic: Another name for “rule of thumb”)*
  + *Control Accounts (Also called control points) can be placed at selected points above the work package level) and are intended for later planning convenience*
  + *At some point below* ***Control Accounts*** *but above the* ***Work Package level*** *are* ***planning packages****, each comprised of work content but without the specific scheduled activities.*
  + *Each WBS element has a unique account code part of a numbering system called the Code of Accounts.*

*NOTES:*

* *The WBS is a 100% document. It captures ALL of the work to be done.*
* *The WBS is deliverable oriented. It contains ALL of the work defined in project scope.*
* *Excessive decomposition is inefficient. (no need to break it down to # steps right, forward, etc)*

**PAGE 113**

* **Control Account (or Control Point)**
* **Planning Package**
* **Work Packages (converted into activities, where deliverables)**

***Scope Baseline***

**PAGE 113**

*SCOPE BASELINE IS comprised of three components:*

* *Project Scope Statement*
* *Work Breakdown Structure—*
* *WBS Dictionary—“Sister to WBS” contains detailed information related to each Work Package (aka deliverable). The contents of the WBS Dictionary could include:*
  + *Statement of Work Reference*
  + *Planned Duration*
  + *Description*
  + *Estimated Budget*
  + *Responsibility*
  + *Resource Requirements*

**Validate Scope**

**PAGE 117**

**Purpose?**

Obtain formal acceptance of the project’s deliverables

**When?**

AFTER deliverables have been developed and deemed correctly developed in the control a quality process

**INPUTS**

* Requirements Documentation
* Requirements Traceability Matrix
* Verified Deliverables
* Work Performance Data (WPD)

**TOOLS AND TECHNIQUES**

* Inspection (always involves customer)
* Group Decision Making Techniques

**OUTPUTS**

* Accepted Deliverables (Gone through validation of scope)
* Change Requests
* Work Performance Information (WPI—is WPD analyzed against baseline)

***Verify Deliverables***

*Deliverables that have been completed and in Control Quality checked for correctness (with respect to the requirements) and compliance (with regard to quality standards)*

***Accepted Deliverables (121)***

*Deliverables that have met the requirements and acceptance criteria and have been approved by the customer (or in some cases sponsor)*

**Control Scope**

**(actual [WPD] vs plans [baselines]) What did we actually produce vs what we SAID we would produce?**

**PAGE 125**

**Purpose?**

Monitor scope status—both product and project scope and manage changes to the Scope Baseline

**How does it help?**

It helps the team preserve the integrity the Scope Baseline throughout the project life cycle.

**When?**

From Scope inception—to the formal acceptance of the deliverables.

**INPUTS**

* Requirements Documentation
* Requirements Traceability Matrix
* Work Performance Data (WPD)

**TOOLS AND TECHNIQUES**

* Variance Analysis

**OUTPUTS**

* Work Performance Information (WPI—is WPD analyzed against baseline)
* Change Requests
* PMP Updates
* OPA Updates

***Variance Analysis (ACTUAL VS PLANNED)***

**PAGE 125**

* *Used to determine cause/degree of difference between performance (actual) and Scope Baseline (plan)*
* *Project Performance Measurements are used to assess the magnitude of variation from the original Scope Baseline*
* *When cause and degree of variance determined then decisions made regarding need for Corrective Action or Preventative Action*

*NOTE:*

* *PLAN SCOPE MANAGEMENT*
* *COLLECT REQUIREMENTS  
  DEFINE SCOPE*
* *CREATE WBS*
* *VALIDATE SCOPE*
* *CONTROL SCOPE*

**Time Management**

**PAGE 132**

**The processes necessary to ensure that the project is completed on time.**

**Plan Schedule Management**

**What’s the Purpose?**

**Produce the schedule management plan, a document that explains policies, procedures and documentation required to properly manage that is, plan develop, execute, control**

**How does it help? (135)**

Produce the Schedule Management Plan, which explains the policies, procedures and documentation required to properly manage (plan, develop, executed and control) the project schedule.

**When? (135)**

AFTER Project Charter has been developed but BEFORE Define Activities process.

**INPUTS**

* Project Management Plan
* Project Charter

**TOOLS AND TECHNIQUES**

* Analytical Techniques

**OUTPUTS**

* Schedule management plan

**Schedule Management Plan**

* A how-to subsidiary management plan that becomes part of the Project Management Plan.
* Establishes the criteria and activities that will be used to develop, monitor and control the Project Schedule

**Define Activities**

**PAGE 138**

**What’s the Purpose?**

Develop and document in the Activity List –the activities that must be performed to produce the project’s deliverables.

**How does it help?**

Provides basis for estimating, scheduling, executing, monitoring, and controlling the work involved in the Work Packages by breaking down the Work Packages into the specific activities required for the completion of the Work Packages, all of which is displayed in the Activities List.

**When?**

AFTER Create WBS and Plan Schedule Management processes and BEFORE Sequence Activities process.

**INPUTS**

* Schedule Management Plan
* Scope Baseline

**TOOLS AND TECHNIQUES**

* Decomposition
* Rolling Wave Planning (a variation of progressive elaboration)

**OUTPUTS**

* Activity List
* Activity Attributes
* Milestone List

***NOTE: Rolling Wave Planning***

* *A form of iterative planning based on the concept of progressive elaboration,* 
  + *Early in the project life cycle, when information is top level and less developed, the project’s far-term work may be planned at the Work Package Level*
  + *Later in the project life cycle, when this far-term work is near0term and detail is clearer, these Work Packages can be then further detailed or decomposed into activities*

***Activity List***

*Everything that needs to be done as an activity to produce deliverable as a result of work packages in WBS*

***Activity Attributes***

*The characteristics associated with the activities on the Activities List, including identifiers, resource requirements, Leads and Lags, Predecessor and Successor activities, activity codes and more.*

***Milestones***

*A significant point or event with ZERO duration*

**Sequence Activities**

**PAGE 144**

**What’s the Purpose?**

Identify and document in a project schedule network diagram, the relationship among the activities previously identified in the Define Activities Process

**How does it help?**

Defines the logical order of work to be performed to obtain maximum efficiency

**When?**

AFTER define Activities process, in which activities have been identified but BEFORE Develop Schedule process.

**INPUTS**

* Activity List
* Activity Attributes
* Milestones

**TOOLS AND TECHNIQUES**

* Precedence Diagram Method (PDM)
* Dependency Determination
* Leads/Lags

**OUTPUTS**

* Project Schedule Network Diagram

***Precedence Diagramming Method (PDM)***

* *Creates a network of activities using boxes called “nodes” to show the activities and arrows to link them. Also known as* ***Activity-On-Node (AON).***
* *PDM is about establishing proper relationships among the activities.*
* *In this method, there are FOUR possible relationships.*
  + *Finish to Start—This is the relationship that is most common*
  + *Finish to Finish—Activity A must finish before B can finish*
  + *Start to Start—Activity A must start before B can start*
  + *Start to Finish—Lease Common*

***SUBNET/FRAGMENT***

*Looking at portions of the network diagram*

***Dependency Determination***

*Four major dependencies*

* *Mandatory: Legally or contractually required. AKA Hard Logic or Hard Dependencies*
* *Discretionary: AKA Preferred Logic or Preferential Logic. If possible, the order may be changed.*
* *External: Beyond the team’s control.*
* *Internal: Within the team’s control.*

***Leads/Lags***

* *A Lead starts and activity BEFORE its predecessor has finished. It’s a head start.*
* *A Lag is a delay before a Successor activity can begin.*
* *LEADS ARE OUT FRONT, LAGS ARE BEHIND*

**Estimate Activity Resources (much more detailed here ex. How many walls, how much paint)**

**PAGE 150**

**What’s the Purpose?**

Estimate the resources—the type and quantity of all equipment and supplies, as well as human resources—that are needed to complete the work involved in each activity documented in the activity list.

**How does it help?**

More accurate cost/schedule estimates

**When?**

AFTER the Project Schedule Network Diagrams have been developed in the Sequences Activities process, but BEFORE the Estimate Activity Durations process.

**INPUTS**

* Activity List
* Activity Attributes

**TOOLS AND TECHNIQUES**

* Alternative Analysis
* Published Estimating Data
* Bottom Up Estimating Data

**OUTPUTS**

* Activity Resource Requirements
* Resource Breakdown Structure (RBS)

***Resource Calendar***

*Shows the availability (working days and shifts) of resources*

***Alternative Analysis***

* *Other ways to perform schedule activities*
* *May include analyses of resource capability or skill levels* 
  + *tools of different types*
  + *machines of different sizes or types*
  + *make or buy decisions*

***Published Estimating Data—Can be quick, but potentially inaccurate***

* *Published production rates and resource unit costs.*
* *Frequently updated for a wide variety of material equipment, and labor trades.*

***Bottom Up Estimating—More expensive, time consuming, but most accurate.***

* *A key estimating tool—considered more expensive and time consuming than other methods but also more accurate*
* *Estimating resources by starting at the bottom of the WBS—at the work package level—and then aggregating up to the Control Account Level.*
* *Usually relies on estimates from the functional organizations or subject matter experts most familiar with the work of the package.*

***Activity Resource Requirement***

The resource type and quantity for each activity in every Work Package (all now in the activity list)

***Resource Breakdown Structure (RBS)***

* *Hierarchical structure of resources*
* *Organized by resource category and resource type*
  + *Resource Categories include*
    - *Labor, Materials, equipment and supplies*

**Estimate Activity Durations**

**PAGE 157**

**What’s the Purpose?**

Estimate the time with the resources previously identified, needed to complete the work involved with the Activities List

**How does it help?**

It provides activity duration estimates

**When?**

AFTER Estimate Activity Resources process and PRIOR to develop Schedule process

**INPUTS**

* Activity List
* Activity Attributes
* Resource Calendars

**TOOLS AND TECHNIQUES**

* Analogous Estimating
* Parametric Estimating
* Three Point Estimating
* Group Decision Making Techniques

**OUTPUTS**

* Activity Duration Estimates

***The Process***

* *Uncertainty=Risk*
* *Some uncertainties are THREATS and some are OPPORTUNITIES*

|  |  |  |
| --- | --- | --- |
| ***Estimating*** | ***AKA*** | ***Description*** |
| *Bottom Up* |  | *More expensive and time consuming than other methods but also more accurate* |
| *Analogous (Top Down)* | *“TOP DOWN”* | * *Is considered less expensive, less time consuming and also less accurate (Like published, but doing it internally)* * *Often used when time is limited or little known about activity or project* |
| *Parametric* | *“MATH”* | * *Some type of math* * *Based upon standards or historical data (bricks laid per hour to estimate how long to build a wall)* |
| *3-Point Estimating* | *“PERT”* | * *Program Evaluation and Review Technique (PERT)* * *Takes into consideration uncertainty of estimates*   + *Optimistic*   + *Pessimistic*   + *Most Likely (Realistic)*   *(4Most Likely + Optimistic + Pessimistic)/6=*  *(4M+O+P)/6* |
| *Published Estimating Data* |  | *Can be quick, but potentially inaccurate* |
| *Standard Deviation* |  | *(P-O)/6* |

***Reserve Analysis***

* ***Contingency Reserve*** *for “known unknowns”—additional cost/time to cover estimating risk:*
  + *Added at Work Package Level*
  + *Most often related to quantified risks*
* ***Management Reserve****—for “unknown unknowns”—for changes to project scope or cost that had not been anticipated. Held outside the baseline but could be in the budget.*
  + *As the project evolves, the reserves must be monitored via Reserve Analysis.*

**Develop Schedule**

**PAGE 170**

**What’s the Purpose?**

To produce Schedule Baseline by way of thorough analysis of the key Outputs from preceding processes—specifically activity sequences, resource and duration requirements, and schedule constraints

**How does it help?**

Results in credible schedule model complete with planned start and finish dates for all project activities

**When?**

AFTER identify risks, Plan Human Resource Management, and all Scope and Time Knowledge Area planning processes

**INPUTS**

* Activity List
* Activity Attributes
* Project Schedule Network Diagram
* Activity Resource Requirement
* Project Staff Requirements
* Project Staff Assignments
* Resource Breakdown Structure

**TOOLS AND TECHNIQUES**

* Critical Path Method
* Critical Chain Method
* Resource Optimization Techniques
* Leads/Lags
* Schedule Compression

**OUTPUTS**

* Schedule Baseline

***Project Staff Assignments***

*Human Resources (real people) to Assume Roles and Responsibilities as defined in the Human Resource Management Plan*

***Schedule Network Analysis:***

* *Generated the project schedule model*
* *Employs various analytical techniques—*
  + *Critical Path Method*
  + *Critical Chain Method*
  + *What-If Analysis*
  + *Resource Optimization Techniques*

*To calculate the early and late start and finish dates.*

***Critical Path Method***

* *Determine minimum duration of project*
* *Determine where the is flexibility in the Project Schedule Network Diagram*

*Early Start= ES*

*Early Finish= EF*

*Late Start= LS*

*Late Finish= LF*

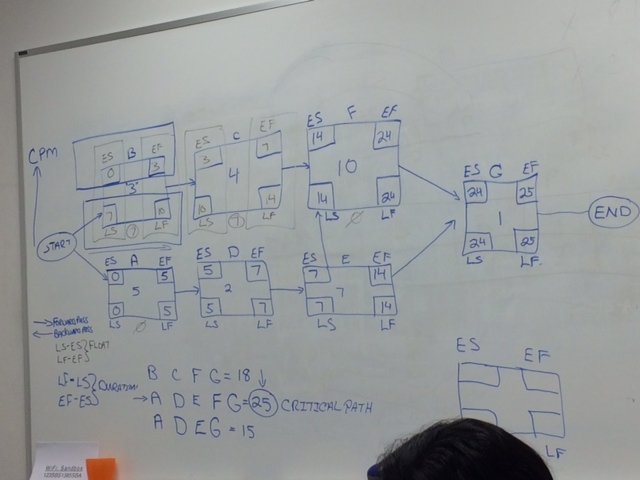
DURATION

X

***ES EF***

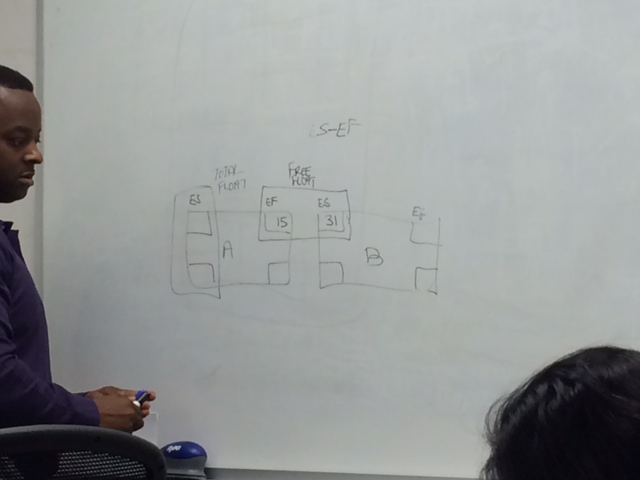
***LS LF***

***NETWORK DIAGRAM***

******

***NOTE: The CRITICAL PATH is the LONGEST path in the network diagram***

***There is NO Float (wiggle room, delay time) for on any task in the Critical Path Method—Page 182***

****

**B C F G =18**

**A D E F G =25 🡪 Critical Path (takes the longest)**

**A D E G =15**

**---> Forward Pass gives you values for Early**

**<--- Backward Pass gives you values for Late**

**LS-ES= FLOAT UP**

**LF-EF= FLOAT UP**

**LF-LS= DURATION ACROSS**

***NOTE: Project Float is NEVER associated with a task.***

***$ponsor needs project in 34 days, you estimate project at 33 days=1 day project float***

***$ponsor needs project in 32 days, you estimate project at 33 days=-1 day project float***

**EF-ES= DURATION ACROSS**

***Critical Chain Method***

* Critical Chain Method adds duration buffers to any schedule path.
  + The Project Buffer, placed at the end of the project, protects the target finish date from slippage

**Resource Optimization Techniques:**

**PAGE 176**

***Resource Leveling***

*Attempts to balance the demand of resources with the supply of resources that are available by adjusting the activities start/finish dates.*

***Resource Smoothing***

*Aims to ensure that the resource requirements do not exceed certain predefined resource limits. Does NOT result in a changed Critical Path or completion date, (modification using “wiggle room” or “float”)*

**Schedule Compression Techniques:**

**PAGE 178**

***Crashing***

* Adding more resources to a task to shorten the duration
* Often increases cost/risk of task

***Fast Tracking (everyone doing things at the same time)***

* Re-planning activities (or phases), initially planned sequentially, to overlap or even run in parallel now
* Can result in rework and increased risk

***NOTE:***

* ***You only fast track and crash tasks that are on the critical path.***
* ***You want to fast track and crash items on the critical path from least expensive to most expensive***

**Control Schedule**

**PAGE 193**

**What’s the Purpose?**

Monitor the status of activities in order to update progress reports and manage changes to the Schedule Baseline.

**How does it help?**

Allows deviation from the plan to be readily detected so that corrective/preventive action can be taken to address such deviation, thereby reducing risk.

**When?**

From Schedule Baseline definition to formal acceptance of deliverables.

**INPUTS**

* Work Performance Data (WPD)
* Project Schedule

**TOOLS AND TECHNIQUES**

* Schedule Compression
* Leads/Lags
* Modeling Techniques

**OUTPUTS**

* Schedule Forecasts
* Work Performance Information
* Change Requests
* OPA Updates
* PMP Updates
* Project Document Updates

***Planning/Time***

***“TIME TO PLANT D SEED”***

***P****lan Schedule Management*

***D****efine Activities*

***S****equence Activities*

***E****stimate Activity Resources*

***E****stimate Activity Duration*

***D****evelop Schedule*

***NOTE: Last planning process of scope time and cost are where BASELINES are created***

**Plan Cost Management**

**PAGE 203**

**What’s the Purpose?**

Produce the Cost Management Plan, a document that explains the policies, procedures and documentation required to properly manage that is, plan, expend, and control project costs.

**How does it help?**

Provides guidance and direction on how to manage project costs

**When?**

AFTER Project Charter has been developed, but BEFORE Estimate Cost process

**INPUTS**

* Project Charter

**TOOLS AND TECHNIQUES**

* Analytical Techniques

**OUTPUTS**

* Cost Management Plan

***Cost Management Plan***

*Describes how cost will be planned, structured and controlled.*

**Estimate Costs**

**PAGE 206**

**What’s the Purpose?**

Estimate the costs with the resources identified and the durations estimate, needed to complete the work involved in each activity documented in the activity list.

**When?**

AFTER Plan Cost Management process and BEFORE Determine Budget

**INPUTS**

* Scope Baseline

**TOOLS AND TECHNIQUES**

* Analogous Estimating
* Parametric Estimating (Math)
* Bottom Up Estimating (Most expensive)
* Three Point Estimating (4MOP)
* Reserve Analysis (Contingency)
* Cost of Quality
* Vendor Bid Analysis
* Group Decision Making Techniques (DUMP)

**OUTPUTS**

* Activity Cost Estimates

***Cost of Quality (COQ)***

* *Includes all costs incurred over the life of the product by investment in preventing nonconformance to requirements, appraising the product or service for conformance to requirements, and failing to meet requirement (rework)*
* *Failure costs often categorized into internal (found by project) and external (found by customer)*
* *Failure Costs are also called Cost of Poor Quality (COQP)*

(Triple Constraint)

**QUALITY REQUIREMENTS**

**SCOPE**

**TIME**

**COST**

The last process of Scope/Time/Cost creates **Baselines**

***Cost of Quality (COQ) to conform are $dollars$ spent during project***

* ***PREVENTIVE***
  + *Training and Education*
* ***APPRAISAL***
  + *Inspections/Tests*

***Cost of Poor Quality (COPQ)—Cost of NON Conformance***

* ***Internal Failure***
  + *Rework*
* ***External Failure***
  + *Warranty Work*
  + *Loss of a customer*

***$$ spend POST Project***

***Vendor Bid Analysis***

* *Analysis of what the project should cost, based on the responsive bids from qualified vendors*
* *In a competitive bid context, additional analysis may be needed to examine the prices of individual deliverables and to derive a cost that supports the final total project cost.*

***Basis of Estimates***

*Details that serve to support the development of each cost estimate, BOWs should provide a thorough understanding of how each estimate was derived*

***Rough Order of Magnitude Budgetary Estimates Definitive Estimates***

*-25% to +75% + or – 15%-25 -5% to + 10%*

**Determine Budget**

**PAGE 214**

**What’s the Purpose?**

Produce the Cost Baseline, an aggregation of all costs estimated for each activity in the Activity List.

**When?**

AFTER costs have been estimated and WELL BEFORE completion of project planning.

**INPUTS**

* Scope Baseline
* Activity Cost Estimated
* Basis of Estimates (BOE)

**TOOLS AND TECHNIQUES**

* Cost Aggregation
* Funding Limit Reconciliation

**OUTPUTS**

* Cost Baseline

***Cost Aggregation***

* *Cost estimates developed for each Work Package, in accord with the WBS are summed up, or “aggregated” to the higher component levels of the WBS such as Control Accounts.*
* *Ultimately Cost Aggregation proceeds until a single figure at the top of the WBS is reach—the Cost Baseline.*

***Funding Limit Reconciliation (Budget Constraint)***

* *Funds expenditure should always be reconciled with any funding limits on the commitment of fund for the project.*
* *A variance between the funding limits and the planned expenditures may require a rescheduling of work to level out the expenditure rate—accomplished by placing imposed date constraints for work into the project schedule.*
* *Funding Limit may delay the project.*

***Cost Baseline***

* *The approved time-phased budget for the project.*
* *Estimates for the Work Packages (with respective Contingency Reserves) are aggregated up to the Control Account level.*
* *All Control Account budgets summed up = Cost Baseline. (Often displayed in an S-Curve)*
* *Then, Management Reserves added to the Cost Baseline = Project Budget!*

**Control Costs**

**PAGE 220**

**What’s the Purpose?**

Monitor the status of activities in order to update project costs and manage changes to Cost Baseline

**How does it help?**

Allows variances from the plan to be readily detected so that corrective/preventive actions can be taken to address such variances thereby reducing risk.

**When? UPDATE**

AFTER costs have been estimated and WELL BEFORE completion of project planning.

**INPUTS**

* Project Funding Requirement

**TOOLS AND TECHNIQUES**

* Earned Value Management (CV, SV, CPI, SPI)
* Forecasting (ETC, EAC)
* To Complete Performance Index

**OUTPUTS**

* WPI
* Change Requests
* OPA Updates
* PMP Updates
* Cost Forecasts

***FORMULAS***

**PAGE 227**

***Be A Pleasant Elf (BAPE)—Think about a contractor***

**BAC Budget At Completion**

$100,000How much is my original planned cost budget

**AC Actual Cost or Actual Cost of Work Performed (ACWP)**

$30,000How much team has spent to date on work that has been performed

**PV Point In Time Planned Value or Budgeted Cost of Work Scheduled (BCWS)**

**x BAC**

$1,000 **Total Time** The MONEY value of where I *planned* to be on this date on sched

**EV = Work Completed Earned Value or Budgeted Cost of Work Performed (BCPW)**

**x BAC**

$750 **Total Work** - The MONEY value of where you *really* are at this date on

Sched

***EARNED VALUE MANAGEMENT (EVM) FORMULAS***

***Santa Clause, Santa Clause, Time for Tommy’s Presents!***

EV = Earned Value: Budgeted cost of Work Performed, value of where I *really* am on this date?

PV = Planned Value: Money value of where you planned to be at this date on schedule

AC = Actual Cost: How much my team has spent to date on work performed

BAC = Budget At Completion: How much was originally planned for project to cost including changes

EAC = Estimate At Completion: Forecasts *final* project cost total

ETC = Estimate to Complete: How much $ do I need to complete project from this point to the end

VAC = Variance at Completion: Old budget minus new budget

**S**V Schedule Variance EV - PV

**C**V Cost Variance EV - AC

**S**PI Schedule Performance Index EV / PV

**C**PI Cost Performance Index EV / AC

**T**CPI To Complete Index BAC - EV / BAC - AC Eff. rate of old budget

**T**CPI To Complete Index BAC - EV / EAC - AC Eff. rate new budget

**%** Complete EV / BAC\*100

Behind ☹ 0 ☺ Ahead SV EV - PV

Over ☹ 0 ☺ Below CV EV - AC

Behind ☹ 1 ☺ Ahead SP1 EV / PV

Over ☹ 1 ☺ Below CP1 EV / AC

***NOTE:* EVERY formula will have Earned Value (EV)**

***FORECASTING FORMULAS***

**EAC =** BAC / CPI Default

**EAC =** AC + ETC

**EAC =** AC + BAC – EV An atypical stop in time

**ETC** = EAC – AC

**VAC** = BAC – EAC

***Estimating Rules—way of identifying what percent complete your task is***

50/50 Rule: Tasks in progress assumed 50% complete

20/80 Rule: Tasks in progress assumed 20% complete

0/100 Rule: Nothing earned until task complete

**Sunk Costs**

Any money that is already spent on project and cannot be recovered

**246**

**Fixed Cost**

Non Recurring expenses, such as set up costs or capital equipment and those costs that are SET and will not change during the Project Life Cycle.

**Variable Costs**Costs that RISE in direct proportion to the size of the project—ex. Costs associated with labor.

**Direct Cost**

Costs that can be attributed directly to the project—ex. Project staff salaries, materials, third-party expenses

**Indirect Cost**

Part of the owning organization’s overheads and shared among all projects/departments—ex. Facilities costs, utilities, management overhead, etc.

**QUALITY MANAGEMENT**

The performing organizations processes and activities that determine the quality, policies, objectives and responsibilities that will ensure the project satisfies the needs for which it was undertaken.

**Precision VS Accuracy—THEY ARE NOT THE SAME!**

Precision: A measure of exactness (tightly clustered darts in same area, but little accuracy)

Accuracy: An assessment of correctness (Same degree of accuracy, but less clustered)

Precision AND Accuracy: Bulls Eye!

**Prevention Over Inspection:**

**Prevention** is keeping errors out of the process while **inspection** is keeping errors out of the customer’s hands. **Prevention** is favored over inspection.

* The time to fix quality problem is during design and planning—not after manufacture.
* Quality is planned, designed, built in, not inspected in.
* Cost of preventing mistakes—less than the cost of correcting them.

**Continuous Improvement**

PDCA: Plan, Do, Check, Act

TQM: Total Quality Management

Six Sigma

Lean Six Sigma

**Customer Expectations**

* Customer Requirements are the basis for managing Quality
* A “Quality product” is one that meets the specification and satisfies the Customer
* Gold Plating—delivering in excess of requirements is always to be avoided

**Quality Management Theories: Cr0sby’s Four Absolutes of Quality**

1. Conformance to Requirements
2. Quality comes from Prevention
3. Aim is Zero Defects (Get it right the first time)
4. Cost of Quality can be measured

**Plan Quality Management**

**PAGE 261**

**What’s the Purpose?**

Produce the Quality Management Plan, which explains how the project will comply with quality requirements and standards that apply to the project and its deliverables

**When?**

AFETR Identify Risks and Identify Stakeholders processes (the Risk Register and Stakeholder Register are key inputs) but WELL BEFORE completion of project planning

**INPUTS**

* Stakeholder Register
* Risk Register

**TOOLS AND TECHNIQUES**

* 7 Basic Quality Tools
  + Cause and Effect Diagrams
  + Control Chards
  + Flowcharts
  + Histograms
  + Pareto Charts
  + Run Charts
  + Scatter Diagrams
* Statistical Sampling

**OUTPUTS**

* Quality Management Plan
* Quality Checklist

*COST OF QUALITY (263) UPDATE THIS*

***Cost of Quality (COQ) to conform are $dollars$ spent during project***

* ***PREVENTIVE***
  + *Training and Education*
* ***APPRAISAL***
  + *Inspections/Tests*

***Cost of Poor Quality (COPQ)—Cost of NON Conformance***

* ***Internal Failure***
  + *Rework*
* ***External Failure***
  + *Warranty Work*
  + *Loss of a customer*

**Seven Basic Quality Tools (“7QC Tools”)**

* **Cause and Effect Diagram (Fishbone or Ishikawa Diagram)**
  + Start point in tracing a problem’s source back to its root cause is the “Problem Statement” (at the head of the diagram)
  + Causes are found by looking at the problem and asking why until actionable root cause has been identified
* Flowcharts
* Check Sheet
* Pareto Diagram
  + A vertical bar cart used to identify the few but important sources of most of a problem’s effects. Associated with the Pareto Principle (aka 80/20 rule), in most cases a few elements (20%) account for the majority of the problems (80%). Therefore (80%) of the problems can be solved by curing (20%) of the causes
* Control Charts
  + Used to determine whether or not a process is stable or has predictable performance
  + Upper Control Limits (UCL) and Lower Control Limits (LCL) are often set at 3 standard Deviations above and below the mean.
  + “Rule of Seven”—if there is seven or more data consecutive points either above or below the mean, the process is out of control.
* Scatter Diagram
  + Diagonal Line
  + Two variables (Dependent/Independent)
  + The closer they are to the diagonal line, they are related to eachother
* Statistical Sampling
  + Involves choosing part of a population of interest for inspection rather than the entire population
    - “Attribute” sample, verifies conformance
    - “**Variable” sample, looks at the degree of the conformance**

**Quality Management Plan (QMP)**

* Describes how quality policies:
  + will be met,
  + how quality standards chosen for project will be implemented
  + and how quality issues will be managed.
* QMP includes Quality Control, Quality Assurance, Continuous Process Improvement

**Quality Checklist**

* Created in Plan Quality Management process, used in Control Quality process to ensure that all Quality steps were performed in the proper sequence.

**Perform Quality Assurance**

**PAGE 274**

**What’s the Purpose?**

Audit the quality requirements and standards selected in the Plan Quality Management process and the measurements taken during the Control Quality Process to ensure compliance with the selected policies and standards.

**When?**

AFTER Plan Quality Management Process in which applicable requirements/standards have been selected, and AFTER measurements have been taken during the Control Quality process, then until transition of project deliverables

**INPUTS**

* Quality Management Plan
* Quality Control Measurements

**TOOLS AND TECHNIQUES**

* Quality Audit

**OUTPUTS**

* Change Requests

**Quality Management and Control Tools**

* The Perform Quality Assurance process uses the tools and techniques of the Plan Quality Management and Control Quality processes.
  + Affinity Diagram
  + Cause and Effect Diagrams

**Quality Audits**

Used to determine if project activities comply with quality policies, processes and procedures.

**Process Analysis**

* Follows the steps in the Process Improvement Plan to identify needed improvements
* Includes Root Cause Analysis, a technique used to
  + identify a problem
  + Discover the underlying causes that lead to it,
  + and develop Preventative Actions

**Control Quality**

**PAGE 281**

**What’s the Purpose?**

Verify the correctness of the deliverables, as a precursor to the Validate Scope process. Document in charts and diagrams the results of quality activities in order to assess performance, recommend changes, and provide input into the Perform Quality Assurance Process.

**How does it help?**

Generates and records the data necessary for use in the Perform Quality Assurance and the Validate Scope Processes

**When?**

Near Project Life Cycle end but usually preceding Validate Scope process

**INPUTS**

* Project Management Plan
* Deliverables

**TOOLS AND TECHNIQUES**

* 7 Basic Quality Tools
  + Cause and Effect Diagrams
  + Control Chards
  + Flowcharts
  + Histograms
  + Pareto Charts
  + Run Charts
  + Scatter Diagrams
* Statistical Sampling
* Inspection

**OUTPUTS**

* Quality Control Measurements
* WPU
* Change Requests
* OPA Updates
* PMP updates
* Validated Changes
* Verified Deliverables

***QUALITY NOTES:THERE WILL BE MANY QUALITY QUESTIONS***

**DEMING’s 85/15 Rule**

* 85/15% Rule says that 85% of a worker’s effectiveness is determined by the system he works in, and 15% from his skill

**JURAN—Fitness for Use**

Pencil should be fit for writing—chair should be fit for sitting.

**JIT**

Just In Time—elimination of inventory, no storage in production area

**Kaizen**

Small incremental changes, more effective than large disruptive changes

**Standard VS Regulation**

* A standard relates to an item specification that has been established by consensus of producers and users.
* A regulation is a legally enforceable requirements that specify the characteristics of a product process service or behavior.

**FMEA**

* + Failure Mode and Effects Analysis
    - Analysis of components to determine their reliability

**Run Chart**

A Run Chart is similar to a control chart, but without limits. ex. Is EKG

**Trend Analysis**

Performed by using Run Charts.

**RACI is a type of RAM**

Stakeholders may need to be classified with:

* Responsibility
* Accountability
* Consulted
* Informed

**Communications Management**

**PAGE 343**

The processes needed to ensure the timely and appropriate treatment of all project information, including the planning, generation, collection, creation, distribution, storage, retrieval, management, control, monitoring, ultimate disposition of project communications.

**Plan Communications Management**

**PAGE 344**

**What’s the Purpose?**

Produce a communications Management Plan which documents a communications approach based on a clear understanding of the Stakeholders and their expectations.

**How does it help?**

Provides team with the most effective and most efficient approach to providing Stakeholders with information

**When?**

After Stakeholder Register has been developed

**INPUTS**

* Stakeholder Register

**TOOLS AND TECHNIQUES**

* Communication Technology
* Communications Model
* Communications Methods

**OUTPUTS**

* Communications Management Plan

**COMMUNICATIONS FORMULA**

**Communications Requirements Analysis**

**N(N-1)**

**2**

**N=stakeholders**

**Communications Technology**

* Vary, from brief conversations to extended meetings
* Factors:
  + Urgency: What is the Urgency, frequency and format of information?
  + Availability: Need to ensure that the technology needed to facilitate communication is compatible available and accessible
  + Ease of Use: Is the choice suitable for those on the team who must use it?
  + Project Environment: Will the team meet face-to-face or virtually?
  + Sensitivity and Confidentiality of Information: Is the information sensitive or confidential? Security measures necessary?

**Communications Models**

* Used to facilitate communications and the exchange of information
* May vary from project to project also within different stages of the same project
* A basic communication model consists of two parties: Sender and Receiver
* **Basic Communication Model** consists of 5 sequence steps:
  + Encode
  + Transmit—Use a “medium” to transmit message, may encounter “noise”
  + Decode—Translated by receiver into a meaningful message
  + Acknowledge—Receiver may or may not signal receipt
  + Feedback/Response—Receiver send their own message back to Sender

**Communication Methods**

* **Interactive Communications**
  + Between two or more parties performing a multidirectional exchange of information. Most efficient way to ensure a common understanding.
* **Push Communications**
  + Sent to specific recipient who need to receive the information (email, memos)
* **Pull Communication**
  + Used for large audiences or large volumes of information (internet sites, knowledge repositories)

**Managing Communications**

**PAGE 354**

**What’s the Purpose?**

Carry out the communications approach detailed in the Communications Management Plan—from creating, collecting, and distributing to storing, archiving and disposing project information.

**How does it help?**

Result of project communications flow that is efficient and effective

**When?**

AFTER Communications Management Plan has been developed

**INPUTS**

* Work Performance Reports

**TOOLS AND TECHNIQUES**

* Communication Models
* Communication Methods
* Information Management Systems

**OUTPUTS**

* Project Communications

**Project Communications**

* Performance Reports
* Status of Deliverables
* Schedule of Progress
* Costs

**Control Communications**

**PAGE 360**

**What’s the Purpose?**

Ensure Stakeholder Information needs are met according to the approach outline in Communications Management Plan.

**How does it help?**

Results in a consistent and optimal flow of information among Stakeholders.

**When?**

From the day the Communications Management Plan is developed—to the end of the Project Life Cycle.

**INPUTS**

* Project Communications
* Issue Log

**TOOLS AND TECHNIQUES**

* Information Systems Management

**OUTPUTS**

* WPI
* Change Requests
* OP Updates
* PMP Updates

**Human Resource Management**

**PAGE 294**

Those processes that organize, manage and lead the project team in such a way that the best use is made of all human resources involved in the project.

**Plan Human Resources**

**PAGE 296**

**What’s the Purpose?**

Identify and document in the HR plan roles and responsibilities, skills and reporting relationships and create a staffing management plan.

**When?**

AFTER Estimate Activity Resources process but PRIOR to Estimate Costs process

**INPUTS**

* Activity Resource Requirements

**TOOLS AND TECHNIQUES**

* Organizational Charts and Position Descriptions

**OUTPUTS**

* Human Resource Management Plan

**Organizational Charts and Positions**

* Ensure Work Package Ownership and team roles/responsibilities are clear/understood by all.
* Three types commonly used:
  + Hierarchical Type
    - Traditional organizational chart format
      * Organizational Breakdown Structure (OBS)

Showing the organization’s departments with Work Packages or activities for which they are responsible listed below each department.

* + - * Resource Breakdown Structure (RBS)

Showing the resource categories and types related to the resources needed by the project.

* + Matrix Based
    - Responsibility Assignment Matrix (RAM)
      * RACI Chart—Responsible Accountable, Consult Inform
  + Text-Oriented
    - In outline form, text oriented formats
      * Provide such team member information as competencies, and qualifications, responsibilities, and authority levels
      * Also known as Position Descriptions or Role Responsibility Authority forms

**Networking**

Interacting with others—in organization, the industry and beyond—in both formal and informal settings.

**Human Resources Management Plan (page 302) update**

Serves to guide the Project Manager and the team in defining, staffing, managing and releasing its Human Resources from further work on the project.

**Training Needs**

If it is known before execution that an assigned resource does not or at project start will not possess the competencies needed to perform their assigned work.

**Recognition and Rewards**

Information describing specific rewards available and detailing the criteria for achieving recognition or the receipt of a reward.

**Acquire Project Team**

**PAGE 305**

**What’s the Purpose?**

Confirm the responsibility of human resources to fill the roles and assume the responsibilities defined in the Human Resource Management Plan and get the team needed to perform the activities defined in the Activity List.

**When?**

AFTER Plan Human Resource Management process but BEFORE Develop Project Team process

**INPUTS**

* HR Resource Management Plan

**TOOLS AND TECHNIQUES**

* Pre-assignment
  + When
* Negotiation
* Acquisition

**OUTPUTS**

* Project Staff Assignments

**Pre-Assignment**

* When project team members are selected in advance they are considered pre-assigned
* The project is result of specific people being identified as part of a competitive proposal
* Dependent upon the expertise of particular persons
* Staff assignments are predefined within Project Charter

**Negotiation**

* Staff assignments are negotiated on many projects. The Project Management Team may need to negotiated with
  + Functional Managers to ensure that competent staff join the team in the required time frame and the project team members will be able/willing and authorized to work on the project for as long as they are needed.
  + Other Project Management Teams to appropriately assign scare or specialized human resources.

**Acquisition**

* Required services may be acquired from outside sources
* May involve hiring individual consultants or subcontracting work to another organization

**Develop Project Team**

**PAGE 313**

**What’s the Purpose?**

Improve team member competencies, team interaction and overall team environment—all to enhance team performance

**When?**

From the day the project team is established to the end of the Project Life Cycle

**INPUTS**

* Project Staff Assignment

**TOOLS AND TECHNIQUES**

* Interpersonal Skills
* Training
* Team Building Activities
* Ground Rules
* Co-Location
* Recognition and Rewards
* Personnel Assessment Tools

**OUTPUTS**

* Team Performance Assessments

**Tuckman Ladder**

Forming—Team meets and learns about projects, formal roles and responsibilities, members are independent and not open in this phase.

Storming—Team begins to address the project work, technical decisions

Norming—Members begin to work together and adjust habits to support team

Performing—Teams operate as a well-organized unit. Interdependent ad work through issues smoothly and effectively.

Adjourning—Team completes work and moves on from project

**Ground Rules**

* Establish clear expectations regarding acceptable behavior by project team members.
* Once rules are established and agreed upon, all project team members share responsibilities for enforcing them.

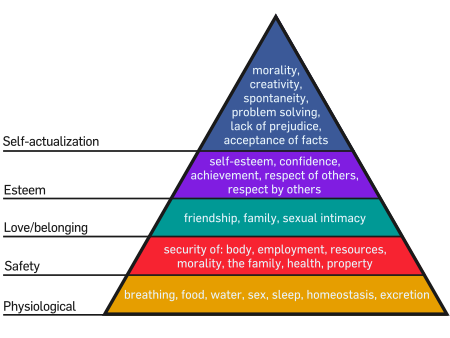
**Co-Location**

* Sometimes called “tight matrix” involved placing many or all of the most active project team members in the same physical location to enhance their ability to perform as a team.
* Co-Location can be temporary, at strategic time or for entire duration of project
* Co-Location can include team meeting room “War Room” which enhances communication and a sense of community
* Use of Virtual Team Benefits: Use of more skilled resources, reduced costs, less travel, fewer relocation expenses, proximity of team members to suppliers, Customers other key Stakeholder

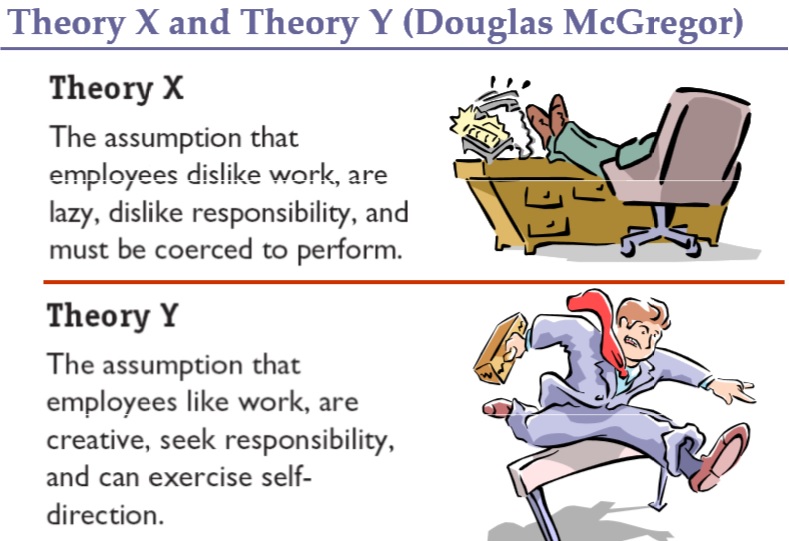
**Recognition and Rewards**

* Plans for ways in which to reward people are developed during the Plan Human Resource Management process.
  + A reward given is effective ONLY if it satisfies a need valued by that individual.
  + Award decisions are made, formally or informally, during the process of managing the project team through project performance appraisals

**Maslow’s Hierarchy of Needs**

[](http://en.wikipedia.org/wiki/File:Maslow's_Hierarchy_of_Needs.svg)

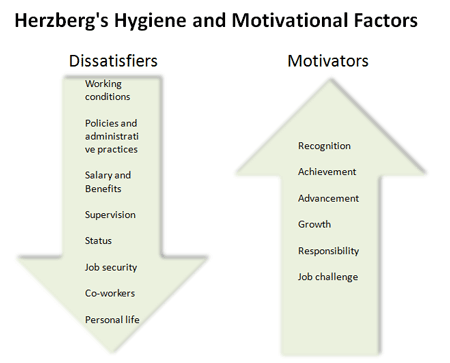
**McGregor’s XY Theory**



**Theory Z - Ouchi**—Motivating the employee to loyalty with the expectations of having a job for life.

**Halo Effect**

Allowing one characteristic of an individual to influence other characteristics of that individual. Ex. Sanjay is a wonderful PM, surely he is a wonderful father.

**Herzberg’s Theory of Motivation**

**Vroom’s Expectancy Theory**

* People will tend to be highly productive and motivated if two conditions are satisfied:
* Believe efforts will lead to successful results
* Believe they will be rewarded for contribution to team’s success
* If their expectations are not met they will be demotivated

**Team Performance Assessments (PAGE 326)**

* Formal or informal assessment of the team’s effectiveness
* Performance of a successful team is measure in terms of three sides: Time, Scope, Cost

**Manage Project Team**

**PAGE 327**

**What’s the Purpose?**

Maximize team performance by monitoring performance of team members, providing feedback to individual team members, resolving issues among them and managing changes to the team

**When?**

FROM the day the project team is established to the end of the Project Life Cycle

**INPUTS**

* Project Staff Assignment
* Team Performance Assessment
* Issue Log

**TOOLS AND TECHNIQUES**

* Observation and conversation
* Project Performance Appraisals
* Conflict Management

**OUTPUTS**

* Change Requests

**Observation and Conversation**

* The objective is to be in touch with project team members and to get a sense of their work and how they feel about it.
  + Management by Walking Around (MBWA)
  + Walk Around Management (WAM)

**Conflict Management**

* Conflict is unavoidable.
  + Priorities related to scheduling
  + Limited Resources
  + Differing styles of work
* Effective Conflict Management may result in
  + Increase in team creativity
  + Better decision making

***NOTE: Conflict is higher for TIME vs $$***

**Five Conflict Resolution Techniques (333-335)**

* Collaborate/Problem Solve
* Compromise/Reconcile
* Smooth/Accommodate
* Force/Direct
* Withdraw/Avoid

**Leadership Styles**

1. **Director**
   1. Project Manager makes the decisions solely by herself. Little or no information requested from the team.
2. **Coach**
   1. PM solicits input but still makes the decisions on her own.
3. **Facilitator**
   1. PM throws open the problem to team for discussion and encouraged team to make relevant decision (AKA Democratic)
4. **Supporter**
   1. PM assumes hands-off leadership allowing team to make decisions. At most observes and advises.

**Types of Power (337)**

* **Legitimate Power**
  + Power that one has because of his/her position within the organization. Successfully used in conjunction with Expert and Reward power.
* **Penalty (or Coercive) Power**
  + Based on fear, ex. The fear of a subordinate who fails to do what the Project Manager asks. This is a subset of Legitimate Power.
* **Reward Power**
  + Opposite of Penalty Power—it involves the ability to reward people in exchange for positive achievements. This is a subset of Legitimate Power.
* **Expert Power**
  + Exercised by Project Managers who are respected because of reputation based on knowledge, skill and experience.
* **Referent Power**
  + Based on being seen to have the backing of a more powerful person as the basis for one’s own authority.

**Constructive Roles on a Team**

|  |  |
| --- | --- |
| **Initiator** | Actively initiates ideas on a project |
| **Information Seeker** | Actively attempting to gain more knowledge so they can relate their understanding to the project |
| **Information Giver** | Openly shares information with the team |
| **Encourager** | Helps maintain a positive and realistic attitude |
| **Clarifier** | Works to make sure everyone understand the project requirements/objectives |
| **Harmonizer** | Attempts to enhance context and details surrounding a project |
| **Summarizer** | Takes details and simply restates them sufficiently |
| **Gatekeeper** | Draw other individuals in |

**Destructive Roles on a Team**

|  |  |
| --- | --- |
| **Aggressor** | Openly hostile and opposed to the project |
| **Blockers** | Tries to block the flow of information and interrupt communication (Noise) |
| **Withdrawers** | Will not participate |
| **Recognition Seekers** | Always attempting to find “what’s in it” for them |
| **Topic Jumpers** | Disrupt effective communication by instantly changing subjects |
| **Dominators** | Disrupts team participation and communication by forcefully injecting their own opinions |
| **Devil’s Advocate** | Automatically takes a contrary view to anything presented |

**Procurement Management**

**PAGE 415**

**The processes needed to acquire and manage resources particularly human resources from sources external to the organization.**

**In procurement, the project manager becomes the buyer. In every other aspect of the project, he is a seller.**

**What’s the Purpose?**

Define and document the team’s procurement approach, its decisions regarding contract/agreement type and identify potential suppliers/contractors.

**When?**

AFTER the Collect Requirements, Identify Risks, Identify Stakeholders, Estimate Costs, and Estimate Activity Resources processes have been completed.

**INPUTS**

* Requirements Documentation
* Risk Register
* Activity Resource Requirements
* Project Schedule

**TOOLS AND TECHNIQUES**

* Make or Buy Analysis

**OUTPUTS**

* Procurement SOW
* Procurement Documents
* Source Selection Criteria
* Make or Buy Decision

***NOTE: Procurement Documents*** *and* ***Procurement Documentation*** *are different. Procurement Documentation is all of the open communication that will be happening between the procuring organization and the PM as long as the project is in execution.*

**Fixed Price Contract—The risk in a fixed price contract is highest for the seller and least for the buyer**

* **Firm Fixed Price (FFP)—Favors the Buyer, nothing changes unless scope does, price is set in stone, seller must complete work no matter what, Buyer must provide a complete and thorough Statement of Work.**
  + Most common type of contract
  + Used mostly for purchase of commodities
  + Scope must be well defined
  + Nothing to do with profit
  + Price is set and does not change (unless scope changes)
* **Fixed Price Incentive Fee (FPIF)—Favors the Buyer but allows for flexibility in Seller performance no present in an FFP contract. Incentive based on Seller performance set at the start, Seller assumes cost of overruns above established price ceiling.**
  + With incentive
  + More flexible to both Buyer and Seller than FFP
  + Incentive is based on Seller’s performance
* **Fixed Price with Economic Price Adjustment (FPEPA)—Provisions for restoring initial expectations of both Buyer and Seller in the event that conditions beyond control of either skew such expectations. Applicable if contract is long term.**
  + Allows for adjustment at the end to restore the initial expectations of both Buyer and Seller

**Cost Reimbursable Contract**

The Buyer will reimburse the seller for all costs plus that seller’s determined profit.

* **Cost Plus Award Fee (CPAF)—Seller is reimbursed for all allowable costs and may also receive a fee based on a Seller’s attainment of performance goals as determined by Buyer. Buyer’s judgment is generally not subject to appeal by Seller.**
  + Seller receives a fee earned only if pre-defined performance criteria are met as judged by buyer
* **Cost Plus Incentive Fee (CPIF)—Seller is reimbursed for all allowable costs and may also receive a fee based on Seller’s achievement of performance goals. Buyer and Seller share cost deviations based on negotiated share ratios, such as 60:40**
  + Seller receives a pre-specified fee based on attainment of specific performance goals
* **Cost Plus Fixed Fee (CPFF)—Seller is reimbursed for all allowable costs and may also receive a fee (based on a percentage of the costs) that is fixed at the start. Fee changes only if scope of work changes.**
  + Seller receives a fixed fee based on costs initially estimated
  + The fee to be paid will be based upon complete work and not performance.

**Time and Materials Contract (Hybrid Contracts)—Rates are known but time is unknown**

* Comprised of both Fixed Fee (FF) and Cost Reimbursable (CR) contract aspects
* Put in place for staff augmentation purposes or if an SOW cannot be developed before time work is required
* Similar to FF contract: Labor and material costs may be pre-specified. Similar to CR contracts: May be left “open-ended” regarding specific work, resulting thereby in cost increases to Buyer.
* There is a contract clause called “Force Majeure”—frees the buyer and seller from liability of the contract based upon things beyond their control (Act of God)

**Make or Buy Analysis (Outsource)**

1. **Need a Cost Benefit Analysis**
2. **Information Capabilities from the Source**

* To determine if the work can be performed in-house or resources need to be obtained from an external source.
* May be heavily influenced by budget constraints—would it be more or less expensive to buy the work from an external source instead of doing work with internal sources?
* Contract types may also be factored into the equation

**Procurement Management Plan**

Describes how services or good will be acquired from outside of the organization.

Provides guidance on:

Types of Contract

Risk Management Issues

Management of Multiple Subcontractors

Selection Criteria

**Procurement Statement of Work (pg. 427)**

* Based on the scope baseline and describes ONLY that portion to be subcontracted
* Must provide enough detail to allow prospective Sellers a thorough understanding of the work
* Level of detail depends on the intended contract type—Fixed Price contract requiring more detail than a Cost Reimbursable Contract

**Procurement Documents**

Each of these documents must contain the procurement statement of work, must be an understanding of a response format, NDAs.

* Used to solicit input from prospective Sellers
  + Request For Proposal RFP
  + Request For Information RFI
  + Request For Quote RFQ
  + Invitation for Bid IFB

**Selection Source Criteria**

Developed by the Buyer for use in scoring or rating the Seller proposals received.

* Price
* Understanding of Need
* Technical Capability
* Management Approach
* Production/Financial Capacity
* Past Performance
* References

***NOTE: When you’re going to award a contract on price alone, use: Tender, Bid, Quote***

**Conduct Procurement**

**PAGE 429**

**What’s the Purpose?**

Receive responses from Sellers, Select Sellers, and award the contracts/Agreements

**When?**

**INPUTS**

* Source Selection Criteria
* Seller Proposals
* Procurement Statement of Work

**TOOLS AND TECHNIQUES**

* Bidder Conferences
* Independent Estimates
* Procurement Negotiations

**OUTPUTS**

* Selected Seller Agreements

*NOTE: In a project we want to attain deliverables and close*

**Bidder Conferences**

* Meeting between Buyer and all prospective Sellers prior to submittal of a bid/proposal.
* AKA Contractor Conferences, Vendor Conferences, Pre-Bid Conference
* Bidder Conferences
  + Aligns goals of Seller AND Buyer
  + To obtain adequate information to present a proposal
  + Independent Estimates serve as a benchmark and are obtained by the PM

**Procurement Negotiations**

* Clarify the structure, requirements and other terms of the purchase so that mutual agreement can be reached prior to signing the contract.
* Final contract language reflects all agreements reached.

**Selected Sellers**

* Prospective Sellers deemed fit to perform the work based on the organization’s evaluations of all Seller proposals.
* If the project is high-value or high-risk, may require approval by Sr. Mgmt before contract award.
* **Sole Source**-No other qualified seller
* **Single Source**-One source was selected
* **Alternative Dispute Resolutions (ADR)**-The stop before having to go to litigation

***NOTE: PM more than likely will not lead negotiations related to contracts.***

**Agreements**

* May be called memorandum of understanding (MOU), a contract, a subcontract, or a Purchase Order—in all cases a legal and binding agreement with Seller obligations (to provide work or services as described within the document) and Buyer obligations (to compensate the Seller for products delivered or Services rendered)
* The only way a contract can be declared illegal is if it violates law.

**Control Procurements**

**PAGE 447**

**What’s the Purpose?**

Manage relations with contracted Seller team members, monitor their performance, make resource changes and amend contracts as required.

**When?**

Starts with the placement of Seller personnel on the team and continues until project closing.

**INPUTS**

* Procurement Documents
* Agreements
* Approved Change Requests

**TOOLS AND TECHNIQUES**

* Procurement Performance Information
* Inspections and Audits
* Performance Reporting
* Payment Systems
* Claims administrations
* Records Management Systems

**OUTPUTS**

* Work Performance Information (WPI)
* Change Requests
* OPA Updates
* PMP Updates

**Records Management Systems**

Automated tool to manage procurement documentation.

**Payment System**

Manages and tracks payments from Buyer to Seller

**Performance Reporting**

Project progress or status

**Procurement Performance Reviews**

Inspections/audits

**Contract Change Control System**

System that the actual contract changes go through

**Claims Administration System**

For disputes or claims. Unresolved claims must go through Alternative Dispute Resolution (ADR)

**Close Procurements**

**PAGE 454**

***Keywords:***

Claims

Settlements

Contract

**What’s the Purpose?**

Formally close procurement contracts upon completion of Seller work.

**How does it help?**

Provides documentation relating to Seller performance including agreements/contracts that will aid project efforts in the future.

**When?**

Upon completion of Seller work.

**INPUTS**

* Procurement Documents (alphabet soup, RFP, RFQ etc)

**TOOLS AND TECHNIQUES**

* Procurement Audits
* Negotiated Settlement

**OUTPUTS**

* Closed Procurements
* OPA Updates

**Procurement Audits (Lessons Learned)**

* A review of the procurement process from the Plan Procurement Process through the Control Procurements process.
* Objective: Identify successes/failures that warrant recognition in the preparation or administration of other procurement contracts on the project, or on other projects within the performing organization.

**Procurement Negotiations**

* Final equitable settlement of all outstanding issues, claims and disputes by negotiation
* When settlement cannot be achieved through direct negotiation, some form of Alternative Dispute Resolution (ADR) including mediation/arbitration may be explored.
* Litigation in courts is least desirable option

**Point of Total Assumption**

(CP-TP/BSR+TC)

CP = Ceiling Price

TP = Target Price

BSR = Buyer Share Ratio

TC = Target Cost

**Procurement File**

Contains contract documentation including the actual contract itself, and any other final project files.

**Closed Procurement**

Deliverables are accepted, scope is validated and procurement would then be closed.

**Early Termination**

Can happen as a result of default, of one of the parties, either or, or by mutual agreement.

**Risk Management**

**PAGE 366**

The processes necessary for risk management planning, risk identification and analysis, risk response planning and risk control throughout the entire project.

**Plan Risk Management**

**PAGE 369**

**What’s the Purpose?**

Produce a Risk Management Plan in which the Project Manager defines and documents how the project’s risk management activities will be conducted.

**When?**

AFTER Stakeholder Register has been developed but early in Project Life Cycle

**INPUTS**

* PMP
* Project Management Charter
* Stakeholder Register

**TOOLS AND TECHNIQUES**

* Analytical Techniques

**OUTPUTS**

* Risk Management Plan

**The Three Risk Factors**

* **Risk Event**
  + What might happen?
* **Probability**
  + What is the chance of it happening?
* **Impact (or amount at stake)**
  + What is financial impact?
* **Exposure** = Probability x Amount at Stake

**Risk Management Plan UPDATE PAGE 373**

**Major Categories to look at as it relates to Risk**

**Risk Breakdown Structure (RBS)**

* Technology or Technical
* Anything to do with a Vendor
* Anything that could affect the Project Team
* Anything that could hinder finances of the project

**Identify Risks**

**PAGE 375**

**What’s the Purpose?**

Identify “uncertain events”—positive as well as negative—that may impact the project, and then document their characteristics in the Risk Register and only the Output of the process.

**When?**

AFTER the Plan Risk Management process and throughout the entire Project Life Cycle.

**INPUTS**

* Risk Management Plan
* Scope Baseline

**TOOLS AND TECHNIQUES**

* Documentation Review
* Information Gathering
* Checklist Analysis
* Assumptions Analysis
* Diagramming Technique
* SWOT Analysis

**OUTPUTS**

* Risk Register

**Assumptions Analysis**

* Assumptions, hypotheses, scenarios lie behind every project and plan.
* Assumptions analysis explores the validity of assumptions as they apply to the project.
* Indicators of risk may be associated with the inaccuracy, instability, inconsistency or incompleteness of assumption

**SWOT Analysis**

* Used to increase the range of identified risks by including internally generated risks.
* Analyzes by using: Strengths, Weaknesses, Opportunities, Threats

**Risk Register—PM’s responsibility**

* Key document in which all identified risk, including their attributes are recorded. Also includes the results of all other risk processes that pertain to risks. Ex. Risk response strategies, qualitative and quantitative risk scores.
* With the results of the Perform Quantitative Risk Analysis process, the Risk Register serves as input to the Estimate Costs process for contingency planning purposes.

**Perform Qualitative Risk Analysis**

**PAGE 384**

**What’s the Purpose?**

Prioritizing the risks identified in the Identify Risks process for more analysis in the Perform Quantitative Risk Analysis process by assessing each risk’s probability of occurrence and its impact on the budget, using among other tools, the Probability-Impact Matrix.

**When?**

(Triple Constraint)

**QUALITY REQUIREMENTS**

**SCOPE**

**TIME**

**COST**

The last process of Scope/Time/Cost creates **Baselines**

AFTER Risk Register has been developed.

RISK

**INPUTS**

* Scope Baseline
* Risk Register

**TOOLS AND TECHNIQUES**

* Risk Probability and Impact Assessment

**OUTPUTS**

* Project Document Updates

**RISK APPETITE**

Risk averse, Risk Neutral, Risk Seeking

**Risk Probability and Impact Assessment**

* An assessment of the likelihood that each of the identified risks will occur—the probability and the effect of the risk, should it occur—the impact.
* Assessment is made by way of interviews or meetings with all involved in the risk processes, internal or external.
* Probabilities and impacts are rated based on the definitions given in the Risk Management Plan.
* Risks rates as low in both probability and impact are placed on a Watch List in the Risk Register.

**Probability and Impact Matrix**

* Used in conjunction with the Risk Probability and Impact Assessment tool to graphically prioritize risks.
* Those risks rated in the process as high priority risks—are moved to “Perform Quantitative Risk Analysis” process for “further analysis” that is for quantitative analysis. Those rated as low are placed on a “watch list”.

**Risk Categorization**

* Used to determine project areas most exposed, risks may be categorized
* Categories may be by the sources of risk (using the RBS) or area of the project affected (using the WBS) or other useful categories (project phase. Risks can also be categorized by common root causes
* Helps determine work packages, activities, project phases that may lead to the development of effective risk responses

**Risk Urgency Assessment**

* Near-Term risks may be more urgent to address than even high-priority far-term risks

**Perform Quantitative Risk Analysis**

**PAGE 391**

**What’s the Purpose?**

Understand the impact of the high-priority risks derived from the Qualitative Risk Analysis by analyzing them numerically—and monetarily, using Expected Monetary Value (EMV) analysis among other tools.

**When?**

AFTER the Risk Register and key plans have been developed and the Qualitative Risk Analysis process have been completed.

**INPUTS**

* Risk Management Plan
* Cost Management Plan
* Risk Register

**TOOLS AND TECHNIQUES**

* Data Gathering and Representation Techniques
* Quantitative Risk Analysis and Modeling Techniques

**OUTPUTS**

* Project Document Updates

**Data Gathering and Representation Techniques**

* Interviewing
* Probability Distributions
* Sensitivity Analysis (Tornado)
  + Helps determine the risks with the most potential impact on the project. Also helps explain the variations in project’s objectives correlated with the variations in different uncertainties.
  + Often displayed in a Tornado Diagram
* Expected Monetary Value Analysis (EMV)
  + Statistical concept that calculates the average outcome when the future includes scenarios that may or may not happen.
  + EMV of opportunities generally expressed as positive values, while those of threats are expressed as negative values.
  + EMV requires a risk-neutral assumption—neither risk averse nor risk seeking

**FORMULA**

Expected Monetary Value = Probability x Impact **EMV = P x I**

**Plan Risk Responses**

**PAGE 404**

**What’s the Purpose?**

Develop plans based on time-tested strategies to reduce the impact of negative risks and enhance the probability that positive risks will occur.

**When?**

AFTER the Risk Management Plan and the Risk Register have been developed.

**INPUTS**

* Risk Management Plan
* Risk Register

**TOOLS AND TECHNIQUES**

* Strategies for Negative Risks
* Strategies for Positive Risks
* Contingency Response

**OUTPUTS**

* PMP Update

**Strategies for Negative Risk**

* **Avoidance**
  + Chosen if a particular risk is simply not acceptable. Find another approach to get the job done or, even if it means abandoning the project, just do not do it at all.
* **Transfer** 
  + There are multiple ways in which risk may be transferred to another party including
    - Buy insurance
    - Performance Bond
    - Warranty
  + Use a subcontractor with a back-to-back agreement
* **Mitigation**
  + Mitigation involves taking actions—within the current project plan that would reduce the probability of the risk happening

**Strategies for Positive Risk**

* **Exploit**
  + Make the most of the opportunity—allocate more budget, resources, give it more management attention
* **Enhance**
  + Increase the probability/and or positive impact of an opportunity
* **Share**
  + Allocating a portion possibly the major portion of an opportunity to a party best positioned to make it happen. Ex. Risk sharing partnerships, joint ventures

**Contingent Response Strategies**

* Some responses are designed for use only if certain events occur requiring a response plan that will be executed only under certain predefined conditions.
  + Contingency Plans
  + Fall Back Plans

***NOTE: A RISK RESPONSE COULD PRODUCE A SECONDARY RISK***

**Control Risks**

**PAGE 409**

**What’s the Purpose?**

Keep track of identified risks, watch out for new ones, implement Risk Response Plans, and evaluate the overall effectiveness of the team’s risk approach.

**When?**

As soon as risks have been identified and a risk management approach has been established.

**INPUTS**

* Risk Register
* Work Performance Reports

**TOOLS AND TECHNIQUES**

* Risk Reassessment
* Risk Audits
* Reserve Analysis

**OUTPUTS**

* Work Performance Information
* Change Requests
* OPA Updates
* PMP Updates

**Risk Reassessment**

* Identification of new risks, reassessment of current risks and the closing of risks that are outdated often result from the Control Risks process.
* Risk Reassessments should be regularly scheduled.
* Detail of appropriate repetition of Risk Reassessments depends on project progress relative to the objectives of the project.

**Risk Audits**

* Examine and document (a) the effectiveness of risk responses in dealing with identified risks and their root causes and (b) the effectiveness of the project’s Risk Management approach, including all of its processes.

**TEST HINTS:**

* 200 Questions
* 4 Hours
* 60-72 seconds per questions
* All multiple choice
* Some scenarios—correct answer and a more correct answer—DO NOT SKIM READ
* MUST, NOT, SOMETIMES, ALWAYS, NEVER in an answer—steer away from those absolutes
* Read all 4 options FIRST, THEN read the question
* The REAL question (majority of the time)—is just above your options
* If you have to read a question more than twice, mark it for review, select an answer and move on
* When it comes to a math question—automatically mark for review and select an answer and move on
* Math is not heavy on the test, but you should know the formulas
* There are 25 questions that are arbitrary that won’t be a part of your score
* MAKE SURE YOU STUDY!!!!!!
* Heavy areas of the test:
  + Quality 30
  + Risk 30
  + Procurement 30
  + Integration
* Remember your “Best Friend”
* Take at least two practice exams before taking your exam
* Do not take your exam until you feel confidently sure about the content
* Create flashcards
* Don’t even pick up the PMP material the day before your test
* Marry info from KA book to PMBOK by knowledge area
* Hang out in the test exams…do them until you get them perfect!