

Estimating – The Art and the Science

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- Now that we're a chapter, you can earn PDUs for tonight's chapter meeting.
- PDU Reporting Information
 - Category 3
 - 1 Hour

PDU Information

- Introduction
- What is an Estimate
- Estimate vs. Estimation
- Types of Estimates
- Estimates and the PMBoK
- Closer Look at the processes
 - Academic and Practical
- Closing Remarks
- Questions
- Drawing and Chapter Business

Agenda

- About Me
- Framework for tonight:
 - 2 perspectives – Academic and Practical
 - Academic – Focus on PMBoK
 - I'll handle this.
 - Practical – What happens in the real world
 - You'll handle this (audience participation and feedback)

Introduction

- So what is an estimate??
 - From dictionary.com - To form an approximate judgment or opinion regarding the worth, amount, size, weight, etc., of; calculate
 - PMBoK - A quantitative assessment of the likely amount or outcome. Usually applied to project costs, resources, effort, and durations and is usually preceded by a modifier (i.e., preliminary).
 - It should always include some indication of accuracy (e.g., \pm x percent).

Estimate

- Estimate implies a calculation has been performed and it is on that basis that a judgment or valuation is being made, while
- Estimation implies that an on-the-spot evaluation is being performed and that it is an opinion based on that evaluation
- Difference - Estimate conveys a more reasoned or impersonal judgment than an estimation

Estimate vs. Estimation

- What do you hear around work?
 - Lots of different things like:
 - Educated Guess
 - Best Guess
 - Ballpark Figure
 - WAG
 - SWAG
 - Initial Impression
 - Opinion
- Which one are you doing?
- Which one should you be doing?

Estimate vs. Estimation

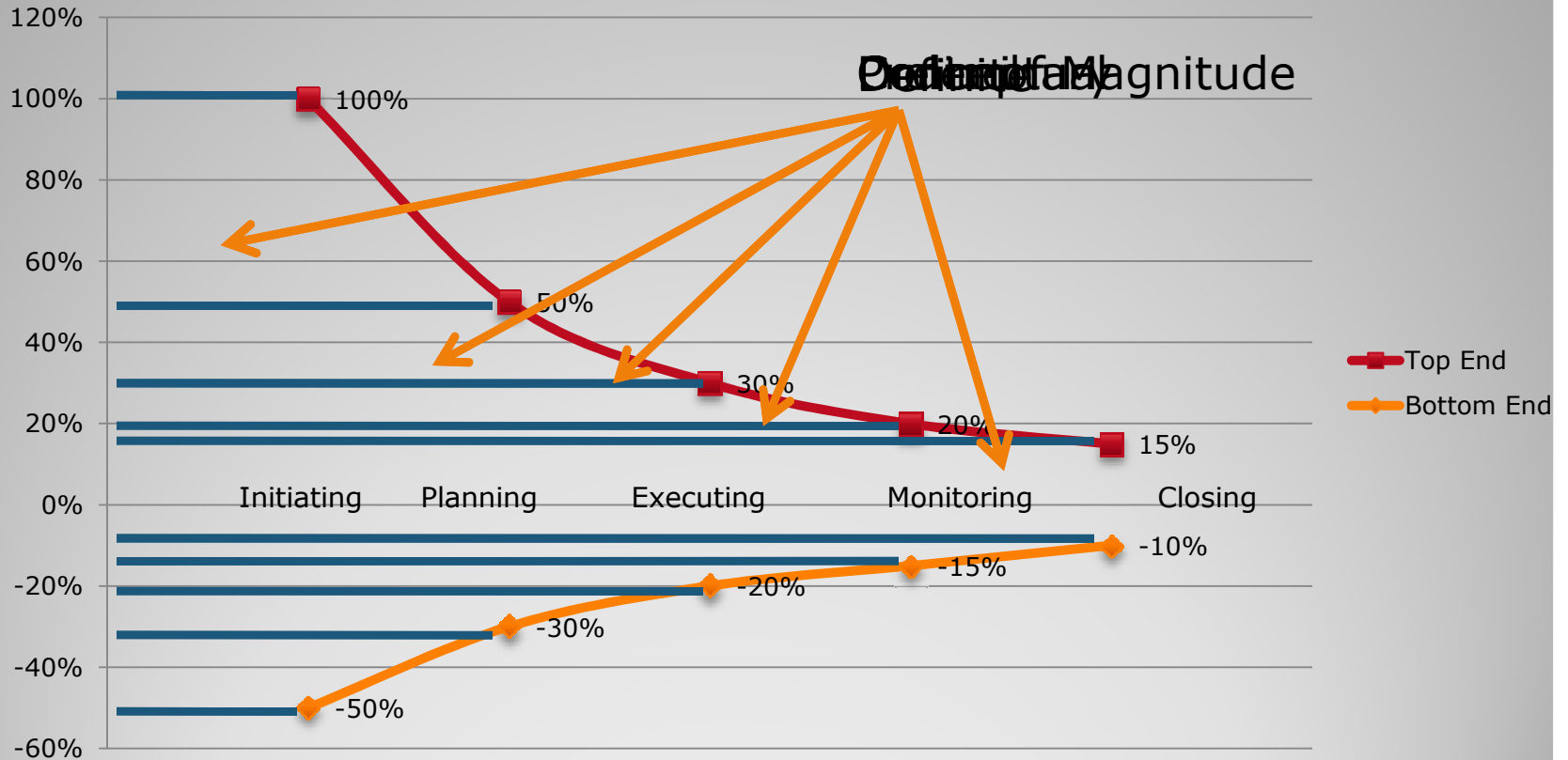
- PMBoK also refers to them as a modifier
 - Modifiers identify a level of accuracy of the estimate

Estimate Types	Range
Order of Magnitude	-50% to 100%
Conceptual	-30% to 50%
Preliminary	-20% to 30%
Definite	-15% to 20%
Control	-10% to 15

- Which one(s) do you use and when?

Types of Estimates

- Typically depends on process group...



Types of Estimates

- Where do they happen?
- Process Group:
 - Planning process group
- Knowledge Areas:
 - Time Management
 - Cost Management

Estimates and the PMBoK

- Estimates are used to set project baselines (schedule and budget)
- These baselines are measured against during monitoring and controlling process group.

Estimates and the PMBoK

- Three key processes:
 - 6.3 Estimate Activity Resources—The process of estimating the type and quantities of material, people, equipment, or supplies required to perform each activity.
 - 6.4 Estimate Activity Durations—The process of approximating the number of work periods needed to complete individual activities with estimated resources.
 - 7.1 Estimate Costs—The process of developing an approximation of the monetary resources needed to complete project activities.

Estimates and the PMBoK

- Academic and Practical
- Remember, I'm going to handle the "academic" and you (the audience) will handle the "practical" look.

Process – Closer Look

- What is it?
- Why is it important?
- When is it performed?
- How it works?
 - Quick PMBoK refresher: Each process group has...
 - Inputs
 - Tools and Techniques
 - Outputs

Process – Academic

- What works/what doesn't work
 - What are your real experiences when it comes to estimating?
- Lessons Learned:
 - Tips and tricks
 - Best practices
 - Watch out for...
 - Gotchas
- Discussion

Process - Practical

- What is it?
 - Determining the size of the activity, the number of resources that will be applied to it and the resource availability.
- Why is it important?
 - You've got to know the number of resources required to complete an activity and determining how long they will be used in that activity.
- When is it performed?
 - After activity definition. This process must be performed before schedule development. It goes hand in hand with cost estimating, since cost and time are closely linked.

6.3 Estimate Activity Resources

- How it works: Inputs
 - Activity List
 - What needs to be done to accomplish the work
 - Activity Attributes
 - Resource Calendars
 - Equipment and HR availability, capabilities, and skills
 - Enterprise Environmental Factors
 - Organizational Process Assets
 - Policies, Procedures, Historical Information

6.3 Estimate Activity Resources

- How it works: Tools and Techniques
 - Expert Judgment
 - Alternative Analysis
 - Other ways of looking at the problem i.e. various levels of resource, skills, machines, build/buy
 - Published Estimating Data
 - Lot of published data that can assist estimating
 - Bottom-Up Estimating
 - Decompose activity into more detail, estimated, then rolled back up
 - Project Management Software

6.3 Estimate Activity Resources

- How it works: Outputs
 - Activity Resource Requirements
 - Types and quantity of resource for each activity
 - Resource Breakdown Structure
 - Hierarchy of identified resource by category and type
 - Project Document Updates
 - Activity List
 - Activity Attributes
 - Resource Calendars

6.3 Estimate Activity Resources

- Practical Look

6.3 Estimate Activity Resources

- What is it?
 - This takes the activity list and breaks down each item to determine how long it will take.
 - Difference between duration and level of effort, and this focuses on determining durations. Duration is a function of many factors (like who is doing the work)
- Why is it important?
 - These become a primary input into creating the schedule when the overall project timeline has been created.
- When is it performed?
 - After the activity resource requirements have been gathered and before the schedule is developed

6.4 Estimate Activity Durations

- How it works: Inputs
 - Activity List
 - Activity Attributes
 - Activity Resource Requirements
 - Output from Estimate Activity Resources (6.3)
 - Resource Calendars
 - Resource type, availability, and skills all impact activity duration
 - Project Scope Statement
 - Identified constraints and assumptions
 - Enterprise Environmental Factors
 - Organizational Process Assets
 - Project calendar, lessons learned, etc

6.4 Estimate Activity Durations

- How it works: Tools and Techniques

- Expert Judgment

- Analogous Estimating

- Parametric Estimating

- Statistical relationship between historical data and other variables to calculate estimate for activity parameters

- $600 \text{ ft of fence} / 100 \text{ ft per hr (avg)} = 6 \text{ hrs}$

6.4 Estimate Activity Durations

- How it works: Tools and Techniques
 - Three-Point Estimates (PERT)

(Optimistic + 4Most Likely + Pessimistic)

6

- Reserve Analysis
 - Account for uncertainty
 - % of work, fix number of periods

6.4 Estimate Activity Durations

- How it works: Outputs
 - Activity Duration Estimates
 - Project Document Updates
 - Activity Attributes
 - Assumptions Made (skill levels and availability)

6.4 Estimate Activity Durations

- Practical Look

6.4 Estimate Activity Durations

- What is it?
 - Each activity is analyzed to evaluate the activity time estimates and the resource estimates associated with them
- Why is it important?
 - You gain detailed understanding of the costs involved with performing a project
- When is it performed?
 - It is performed over and over again. Currently, the only process that must be done before cost estimating is scope definition and create WBS.
 - It is normal to perform activity definition, activity resource estimating, and activity duration estimating first, because costs are estimated against schedule activities

7.1 Estimate Costs

- **How it works: Inputs**

- **Scope Baseline**
 - Scope Statement (assumptions, risks, etc) and WBS
- **Project Schedule**
 - Type, quantity, time to complete work
- **HR Plan**
 - Staffing attributes and rates
- **Risk Register**
 - Any costs associated with risk mitigation
- **Enterprise Environmental Factors**
 - Market conditions, commercial information
- **Organizational Process Assets**
 - Estimating policies, templates, historical info, lessons learned

7.1 Estimate Costs

- How it works: Tools and Techniques
 - Expert Judgment
 - Analogous Estimating
 - Parametric Estimating
 - Bottom Up Estimating
 - 3 Point Estimates
 - Reserve Analysis
 - Cost of Quality (COQ)
 - PM Estimating Software
 - Vendor Bid Analysis

7.1 Estimate Costs

- How it works: Outputs
 - Activity Cost Estimates
 - Basis of Estimates
 - Supporting detail for activity cost estimates
 - Project Document Updates

7.1 Estimate Costs

- Practical Look

7.1 Estimate Costs

- Closing Remarks
- Questions/Comments/Discussion??
- Thanks everybody!

Wrap Up