How to Schedule your Project to Dedicate the Most Amount of Time Managing and Prevent Project Tools from Managing You

Fernando Portes, MBA/MEng/MPS/PMP/CQE
Principal, Best Project Management
Affiliate Professor, Stevens Institute of Technology

Best Project Management℠ Results

About the Author

Fernando Portes, MBA/MEng/MPS/PMP/CQE, Principal and Owner, Best Project Management (www.bestpjm.com) , is an experienced project/program manager, engineer, and educator, who has published more than ten managerial and technical publications*, and who managed projects and programs for Schering-Plough, Merck, Johnson & Johnson, Wyeth, Baxter, Actavis, and Mayne Pharma. He is listed in Who is Who in Science and Engineering, in Who is Who in the US, and in Who is Who in the World. He has taught at the graduate and undergraduate levels in three universities, and was rated as one of the best project management professors at the Howe School of Stevens Institute of Technology, where he developed and taught the pharmaceutical project management class to several Fortune 500 organizations since 2005. Portes is a member of the Project Management Institute (PMI) and of the Cornell Engineering Alumni Association (CEAA). He has MEng and MPS degrees from Cornell University and an MBA from Catholic University (Santo Domingo). He speaks Spanish and French and can be reached at portes@bestpjm.com.

**. After this seminar this presentation can be downloaded from: http://www.bestpjm.com/our-staff.html.*

The Facts

- A Fortune 500 pharmaceutical organization hired Portes in 2008 to manage a program of seven teams to start up a $240 million pharma manufacturing facility.
- A generic pharmaceutical company hired Portes in 2007 to manage the start up of a pharmaceutical facility.
- A biopharma organization had asked Portes in 2006 to analyze their start up schedule and to propose ways to improve it because generating information and reports was taking too long.
- In the mid 90s Portes prepared the schedule for the technology transfer of a biopharmaceutical between a Fortune 500 pharma and an smaller organization.
- In the early 90s Portes prepared the schedule for the technology transfer of several products for a Fortune 500 medical devise organization.

The Objectives

- Prepare an start up schedule integrating the work of the seven start up teams, and linking it to the construction and commissioning and qualification (C&Q) schedules that had been developed by two other organizations.

- Spend the most of amount of time managing the program* and the least amount of time managing the schedule.

**. Integration, communications, monitoring, control, conflict resolution, risk analysis, problem solving, program deliverables, etc.*

Revision of Scheduling Basics

- **WBS (Work Breakdown Structure):** *"..is a deliverable oriented hierarchical decomposition of the work to be executed ....."*

  PMBOK, 4th Edition, 2008, p. 116.

- **Scheduling:** The conversion of the WBS into an operating timeline.

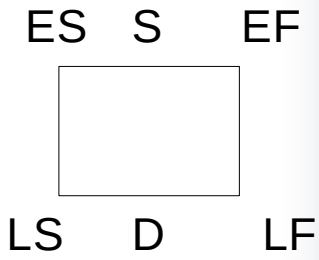
Revision of Scheduling Basics

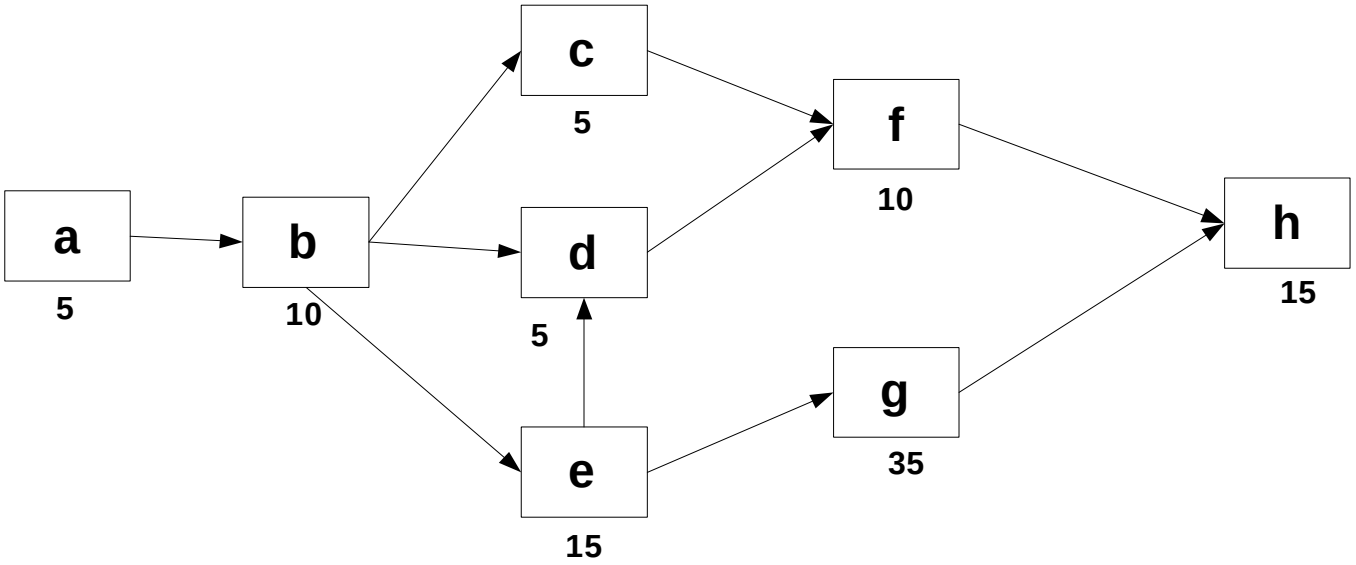
Given this WBS, define its schedule

task	precedence	time (days)
a	-	5
b	a	10
c	b	5
d	b,e	5
e	b	15
f	c,d	10
g	e	35
h	f,g	15

Revision of Scheduling Basics

1. Draw the Network





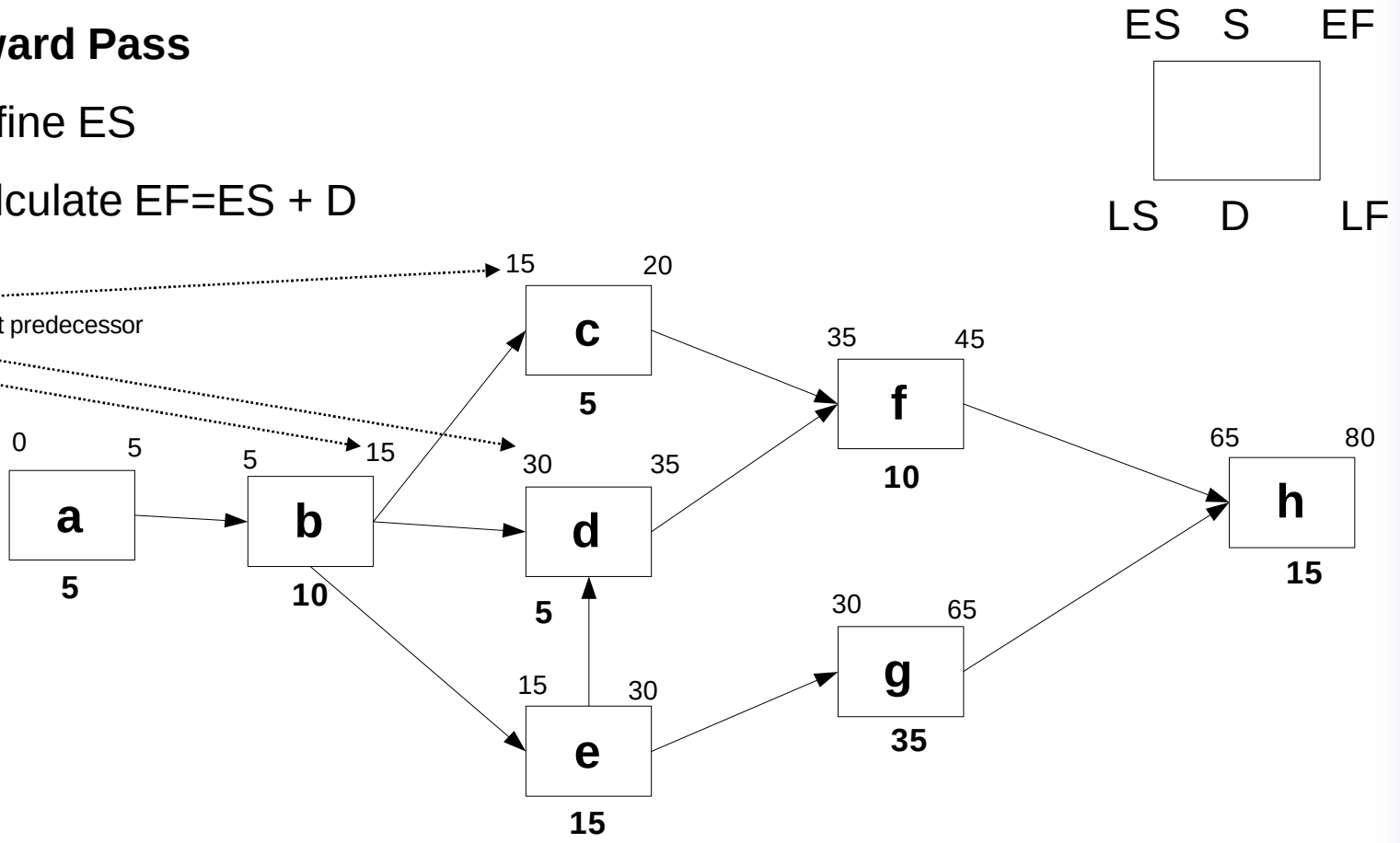
Revision of Scheduling Basics

2. Forward Pass

2.1. Define ES

2.2. Calculate EF=ES + D

latest predecessor

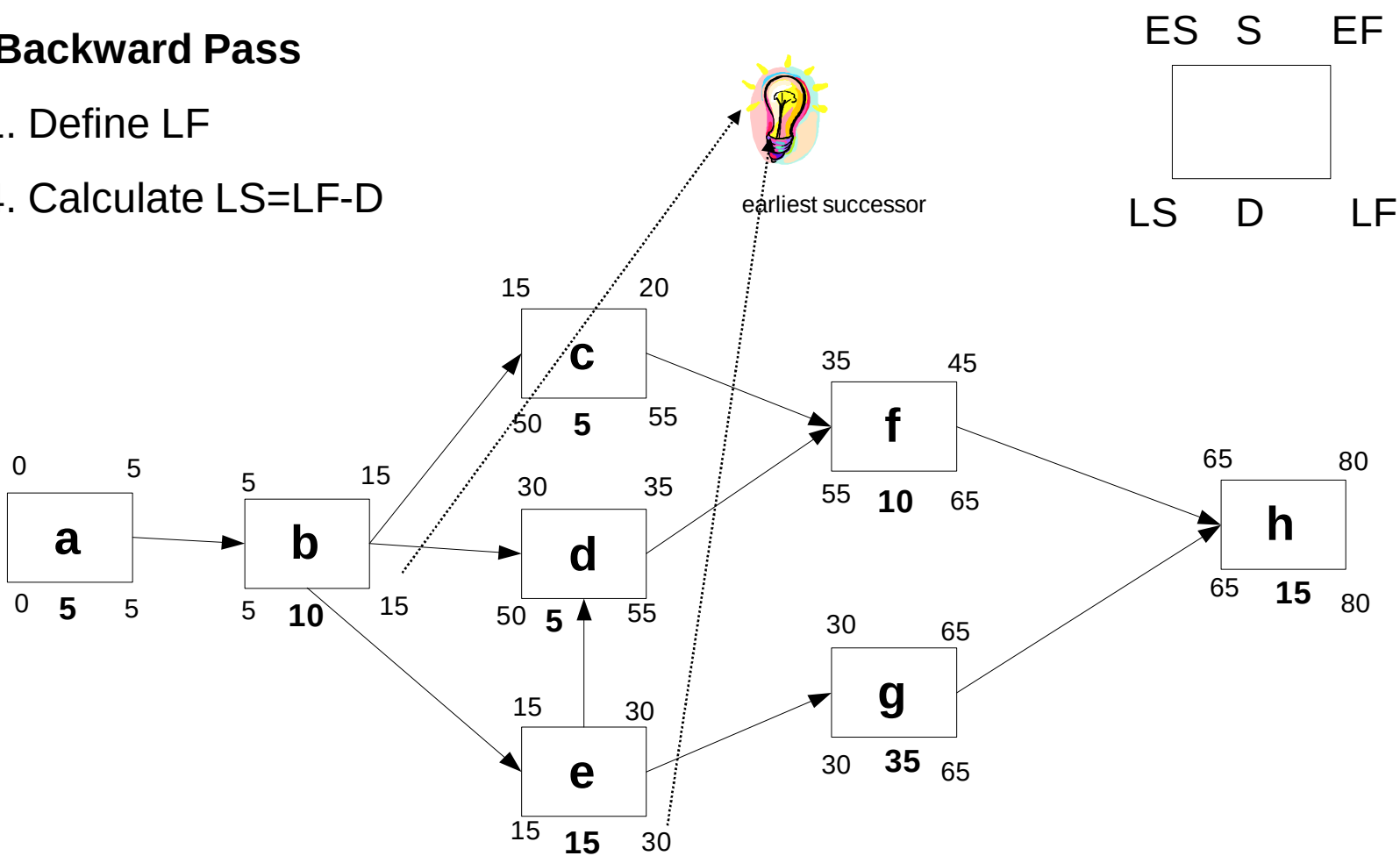


Revision of Scheduling Basics

3. Backward Pass

3.1. Define LF

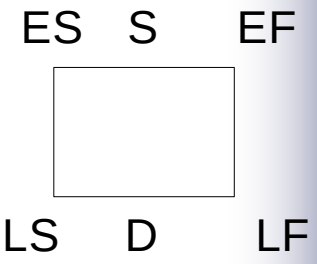
3.4. Calculate LS=LF-D

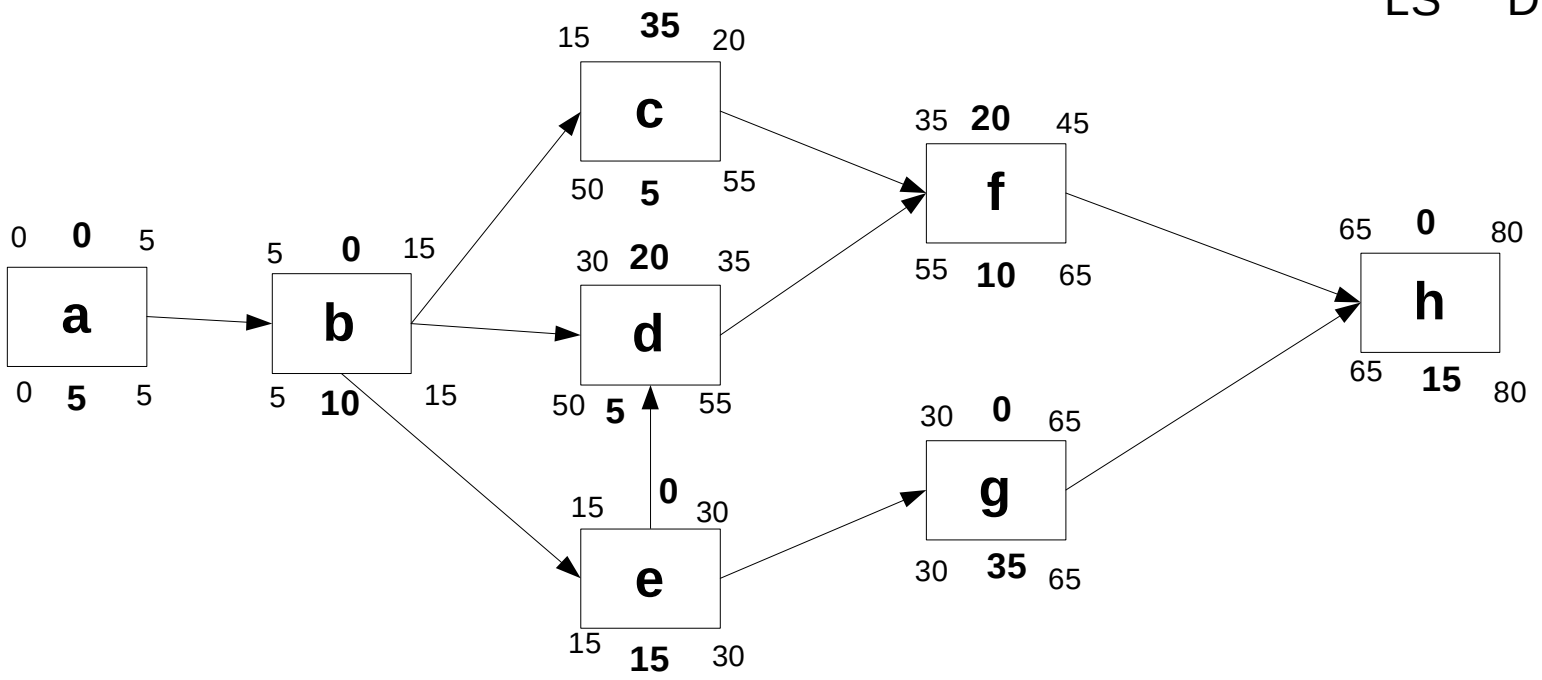


Revision of Scheduling Basics

4. Total Slack (Float)

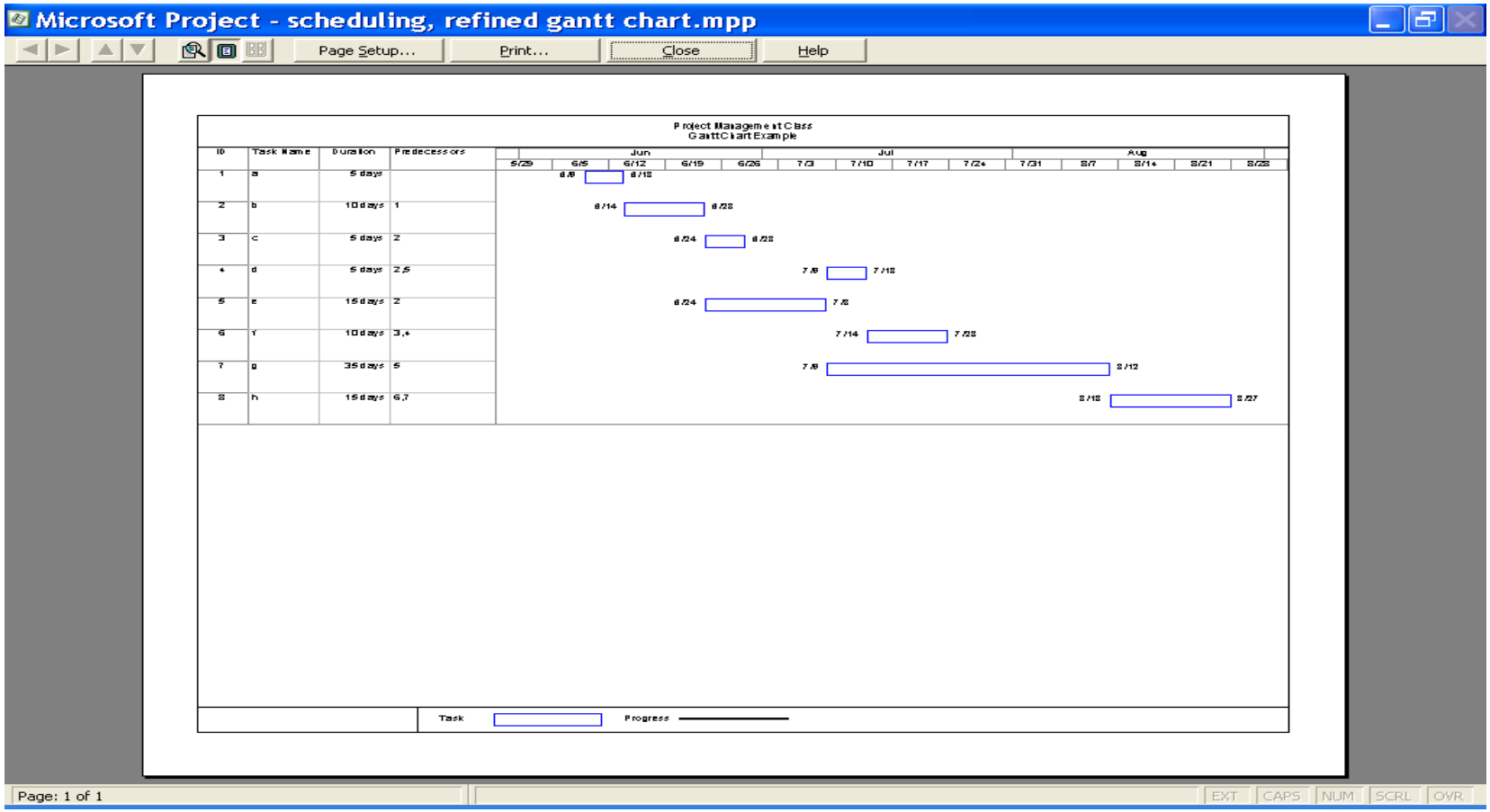
TS=LF-EF=LS-ES





Revision of Scheduling Basics

Currently most schedules are done with PM software, such as MS Project:



The Problems

- **Too detailed WBS**. Twenty years of program and project management experience taught the author that quite often project schedules are too detailed. For example, the C&Q schedule of the biopharma organization had more than 3,000 activities and the construction and C&Q schedule of the Fortune 500 pharmaceutical manufacturing project had more than 14,000 activities.

The Problems

- **Too much project management resources managing the detailed WBS**. As a result of project schedules with too many activities, some organizations must then have full time schedulers and/or project managers who spend too much time just managing the huge schedule, and not managing the project*.

*. *Integration, communications, monitoring, control, conflict resolution, risk analysis, problem solving, program deliverables, etc.*

The Problems

- **Focus**. The focus then becomes the tool (schedule) and not the project. As a result, the tool (schedule) manages the project manager, which creates an unnecessary and preventable project risk*.

*. *Worldwide in all industries, most projects are executed late, over budget, or are abandoned before completion. Reinventing Project Management.. Shenhar, Dvir. 2007, p.5. The Anatomy of Major Projects: A study of the Reality of Project Management. Peter Morris. 1990. p. 7. The Management of Projects, Peter Morris, p. 4-212. Project Management: A Managerial Approach. Meredith, Mantel. 2003, p.353.*

The Problems

- **Difficult integration*, monitoring, and control**. A too detailed WBS cannot be fit into a **one page*** Gantt chart, and the project reports that must be generated for monitoring and control then become far more complicated and time consuming to generate.

*. *Integration is of the most important project management knowledge areas and Portes finds that one page Gantt charts of the entire schedule significantly improve all integration activities.*

The Problems

- **Wasted resources**. *"Rarely the execution of a project proceeds as initially planned"*.* Therefore, the more detailed the WBS and the schedule, the more resources that will be wasted creating and updating unnecessarily detailed schedules.

**. Practice Standard for Scheduling. Project Management Institute. 2007, p.1.*

What do mainstream project management books say?

- **Project Management. The Managerial Approach. Meredith, Mantel. 7th Edition, 2009. Project Management. The Managerial Process. Gray, Larson. 2nd Edition, 2003. Project Management. A Systems Approach. Kerzner, 8th Edition, 2003*.**

  Nothing.

- **Work Breakdown Structures. The Foundation for Project Management Excellence. Norman, Brotherton, Fried. 2008.**

  Nothing.

- **Dynamic Scheduling with MS Project. Ambriz. 2007.**

  Nothing.

**. Those are three of the most popular entry level project management books.*

What do mainstream project management books say?

- **Practice Standard for Scheduling. Project Management Institute. 2007.**

  Nothing.

- **A Guide to the Project Management Body of Knowledge (PMBoK), 4th Edition, 2008**. Not enough details.

  1. *" Decomposition is the subdivision of project deliverables into smaller, more manageable components until the work and deliverables are defined to the work package level. The work package level is lowest level in the wbs and is the point at which the **cost** and the activity **durations** for work can be reliably estimated and managed"* (p. 118).

  2. *"...excessive decomposition can lead to non productive management effort, inefficient use of resources, and decrease efficiency in planning the work"* (p. 120).

What do mainstream project management books say?

- **Practice Standard for Work Breakdown Structures. Project Management Institute. Second Edition. 2006.** Ambiguous / Non specific.

  - Quality characteristics expected in a WBS (p. 20).

  - *"All deliverables .... should be neither so small that the cost of control is excessive, nor should be so large that the item is unmanageable or the associated risk cannot be identified"* (p. 20).

  - Further decompose the WBS if the answer to any of the questions in p. 36 is yes, which leads to unnecessary decomposition.

  - *"Decompose the WBS to the appropriate level of detail by achieving a balance between project complexity, risk, and the project manager's need for monitoring and control..... Do not decompose the WBS too far.....Excessive WBS levels can require unrealistic levels of maintenance and reporting"* (p. 38).

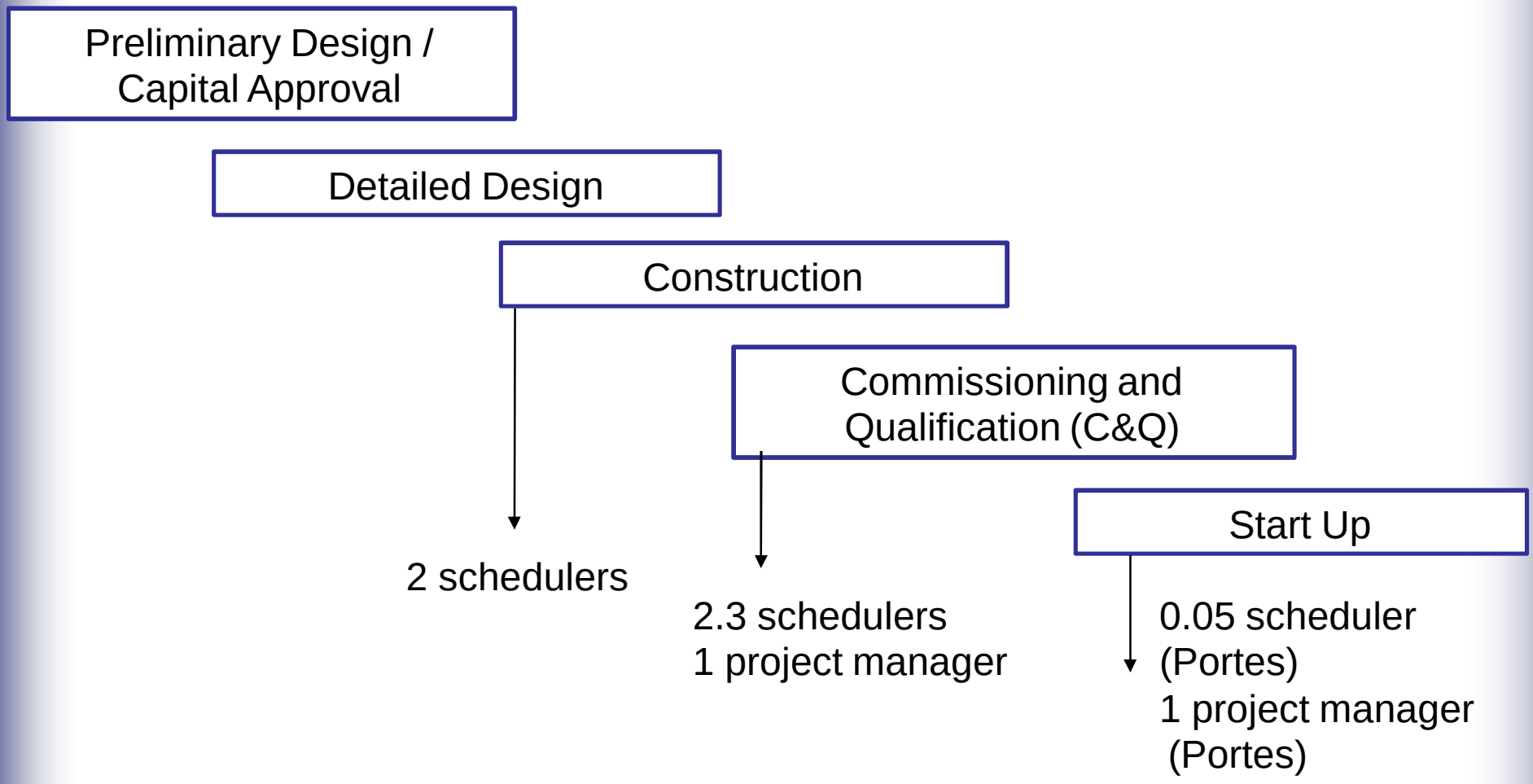
What do academia and practitioners say about detailed schedules?

- **There is consensus in academia and among project managers that most projects do not fail because of schedules. Instead, most project failures are associated with organizational and environmental factors.** *Reinventing Project Management. Shenhar, Dvir. 2007. The Anatomy of Major Projects: A study of the Reality of Project Management. Peter Morris. 1990. The Management of Projects, Peter Morris, p. 4-212. PMNework. May 2004. p.12.*

In Practice

- **Too detailed WBS**. Twenty years of program and project management experience taught the author that quite often project schedules are too detailed. For example, the C&Q schedule of the biopharma organization had more than 3,000 activities, which required one full time scheduler. The construction and C&Q schedule of the pharmaceutical manufacturing project had more than 14,000 activities, which required two construction schedulers, three C&Q schedulers, one C&Q project manager, and one start up project manager (Portes).

Schedulers and Project Managers in Capital Project



Suggestions to the PMI WBS Standard

- **Do not include lists or groups of anything in the WBS**. For example, around 77 new or modified standard operating procedures (SOPs) were needed for the start up of the $240 capital project. If each SOPs is broken down into three activities*, then this would have required to add 231 (77x3) activities to the schedule. Similarly, dozen of portable equipment (tanks, kettles) needed to be transferred to the new facility, which would have required dozens of activities in the schedule. This suggestion contradicts the PMI Practice Standard for Work Breakdown Structures (p. 36) which advises to break the WBS if it contains more than one deliverables and if it needs to be performed by more than one individual.

**. Development, approvals, trainings.*

Suggestions to the PMI WBS Standard

- **Manage lists or groups with Excel Auto Filers, Pivot Tables, and Advanced Filers**. MS Excel is far more powerful than MS Project to handle lists and tables. Portes used this approach both in the start up of a solid dosage facility in 2007 for a generic manufacturing company and in 2009 for a Fortune 500 pharmaceutical organization. Both clients were satisfied with using Excel pivot tables to handle long lists of SOPs and less important equipment.

Suggestions to the PMI WBS Standard

- **Do not include approvals**. The approvals of project plans, protocols, SOPs, capital allocations and other documents is fairly unpredictable in most organizations due to many factors. Hence, it is not worth detailing activities subject to significant uncertainty. Instead, monitor and control those activities outside the WBS with the regular project meetings or with individual interactions with the project stakeholders.

Suggestions to the PMI WBS Standard

- **Do not include industry understood deliverables or activities**. For example, in most cases there is no need to break the down the qualification of a major piece of equipment into:
    1. IQ/OQ/PQ protocol development.
    2. IQ/OQ/PQ protocol approval
    3. IQ execution.
    4. IQ deviations corrections.
    5. IQ approval.
    6. OQ execution.
    7. OQ deviations corrections
    8. IQ/OQ protocol closure,.
    9. PQ execution.
    10. PQ protocol closure.
- Instead, consider simplifying those activities to say equipment 1 validation. The validation master plan and the validation protocols are better documents to specify those activates than the WBS or the schedule.

Suggestions to the PMI WBS Standard

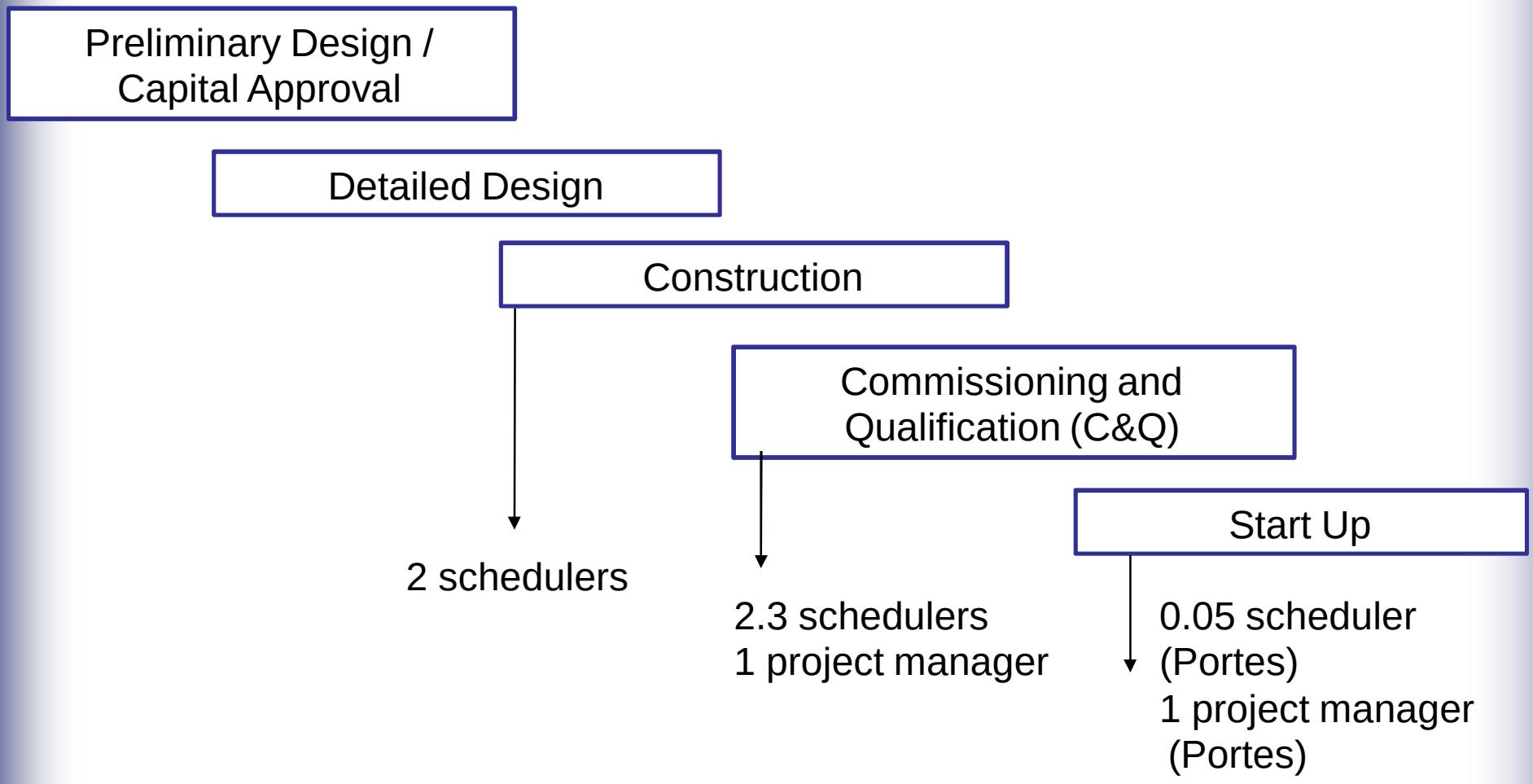
- **Only include in the WBS/schedule items from the lists or groups when there are significant risks that they would not be ready**. This significantly reduces the amount of items to monitor and control.

- **One page Gantt charts**. Keep the WBS up to the point that the entire program/project can fit into one page to facilitate integration activities.

Suggestions to the PMI WBS Standard

- **Divide the WBS only up to the point when deliverables can be estimated, managed, and controlled**. The WBS should only be broken down based on analysis of factors on why it is broken down. Some of those factor are:
  1. Knowledge. The more knowledge of the project team on certain WBS deliverables, the less than the WBS should be broken down and vice versa.
  2. Risks. The more risks associated with WBS deliverables, the more than those WBS should be broken down.

Schedulers and Project Managers in Capital Project



Results

- First draft WBS/schedule for the start up of a $240 million pharmaceutical facility was prepared in one week in just one 24”x32” poster size print, was approved in one month, and was used during the entire one year project start up to monitor and control all start up activities.

- Portes, the program manager, spend most of his time managing the project* and less than 5% of his time managing the schedule.

- Project was finished on time and on budget, and the client was fully satisfied.

**. Integration, communications, monitoring, control, conflict resolution, risk analysis, problem solving, deliverables, etc.*