



“Schedule Development Using MS Project, and Application of Quantitative Risk Analysis with Monte Carlo Simulation and @Risk”



**Chris Mauck, PMP
August 14, 2007**

Agenda

- Tracking Settings
- Effectively using Task Types
- Master Projects and Cross Project Dependencies
- Creating baselines and managing baseline changes
- Conducting risk analysis using @Risk for Project

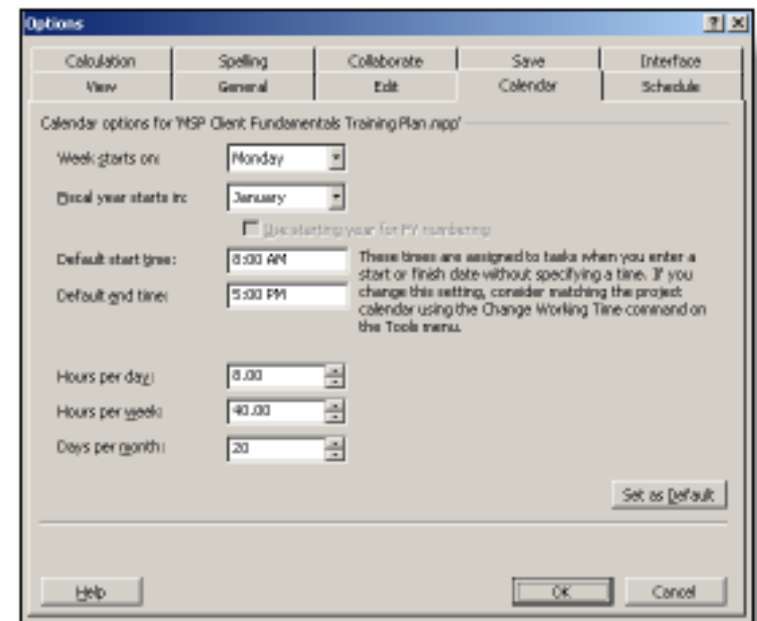
Default Tracking Settings

Critical settings to consider are...

- When does the work week start.
- The default start time for resources.
- The default end time for resources.
- The Number of hours per day/week/month.
- The Default task type.
- Whether or not new tasks are effort driven.

Working Time

- MSP Client automatically calculates down to the hour and seconds.
- **If...** A new task is created without entering the time, the start time will automatically be 8:00am.
 - Or whatever the Project Manager defined as the *start working time*.



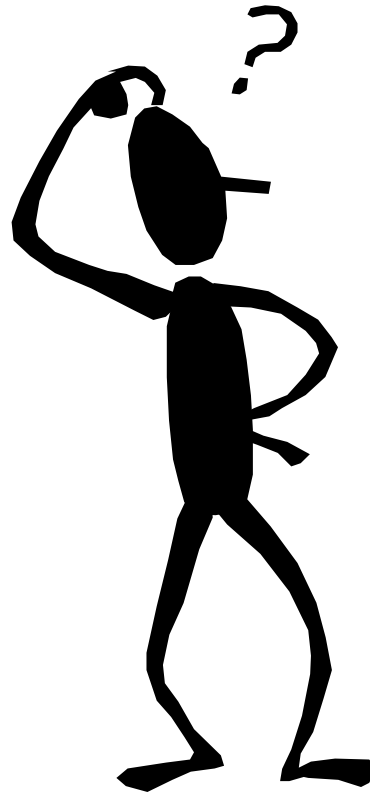
Hours per Day/Week/Month

If...

- You create a **1 Day** task, Project will automatically calculate it to be **8 Hours**.
 - Or whatever settings the Project Manager defined.
- You create a **1 Week** task, Project will automatically calculate it to be **40 Hours**.
 - Or whatever settings the Project Manager defined.
- You create a **1 Month** task, Project will automatically calculate it to be **20 Days**.
 - Or whatever settings the Project Manager defined.

Duration/Work/Units

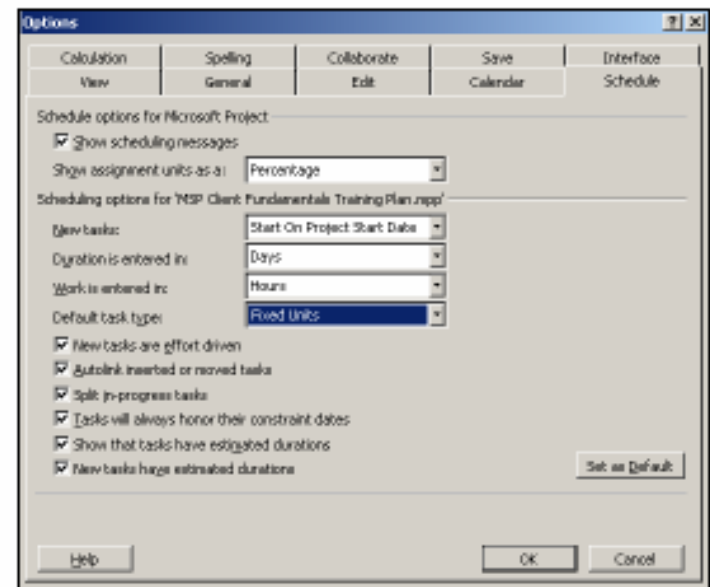
$$\text{Work} = \text{Duration} * \text{Units}$$



Default Task Type

There are Three Task Types...

- **Fixed Units** – A fixed amount of resources are required to complete the task.
- **Fixed Work** – A fixed amount of *work (hours)* is required to complete the task.
- **Fixed Duration** – A fixed amount of time is required to complete the task.



Effort Driven Scheduling

- Regardless of the number of resources you assign, the task's initial work value, or amount of effort, remains constant
- Project applies effort-driven scheduling only when you assign resources to or remove resources from tasks.

Fixed Units

If...

- A Project Manager adds more hours to a task, but still wants it done on time...
- ... Project will automatically increase the duration.
- **This is good because:** It may reflect reality.
- **This is bad because:** People can work extra hours and still get the work done on time.

Fixed Units Example

TASK

Resource = Steve
Work Hours = 8 Hours
Duration = 1 Day

Change to 10 Hours

TASK

Resource = Steve
Work Hours = 10 Hours
Duration = **1.25 Days**

Fixed Work

If...

- A Project Manager adds more resources to a task, the duration will automatically be reduced.
- A Project Manager adjusts hours required for a task, Project may adjust the duration.
- **This is good because:** The hours required for a task will not be changed by Project.
- **This is bad because:** The duration is typically not reduced in half just because new resources are added.

Fixed Work Example

TASK

Resource = Steve[50%]
Work Hours = 8 Hours
Duration = 2 Days

→ Add Mary to Task

TASK

Resource = Steve[50%]
Resource = **Mary**
Steve Hours = **2.67 Hours**
Mary Hours = **5.33 Hours**
Duration = **.67 Days**
Total WORK = 8 Hours

TASK

Resource = Steve
Work Hours = 8 Hours
Duration = 1 Day

→ Change to 2 Days

TASK

Resource = Steve[50%]
Work Hours = 8 Hours
Duration = **2 Days**

Fixed Duration

If (*Assume 1 Day = 8 Hours*)...

- A Project Manager creates a 1 day task and assigns the resource to work 12 hours, the duration will not change. However, if the Project Manager manually increases duration, the work hours for resources will increase as well.
- **This is good because:** People can work overtime without increasing the overall schedule and resource modifications will not adjust the duration.
- **This is bad because:** If the duration is increased, that does not necessarily mean you want the resources working more hours.

Fixed Duration Example

TASK

Resource = Steve
Work Hours = 8 Hours
Duration = 1 Day

Change to 12 Hours →

TASK

Resource = Steve[150%]
Work Hours = **12 Hours**
Duration = 1 Day

TASK

Resource = Steve[150%]
Work Hours = 12 Hours
Duration = 1 Day

Change to 2 Days →

TASK

Resource = Steve[150%]
Work Hours = **24 Hours**
Duration = **2 Days**

Effort Driven

- Automatically adjusts duration based on number of resources added.

If...

- A Project Manager creates a 1 Day task with one resource and later adds a second resource, the duration will be reduced to .5 Days.
- **This is good because:** Some tasks will reduce greatly in duration depending on the number of people put on it.
- **This is bad because:** Most Project Managers assign *work* hours and keep a constant duration until or unless they determine the duration should be changed.

Task Type Summary

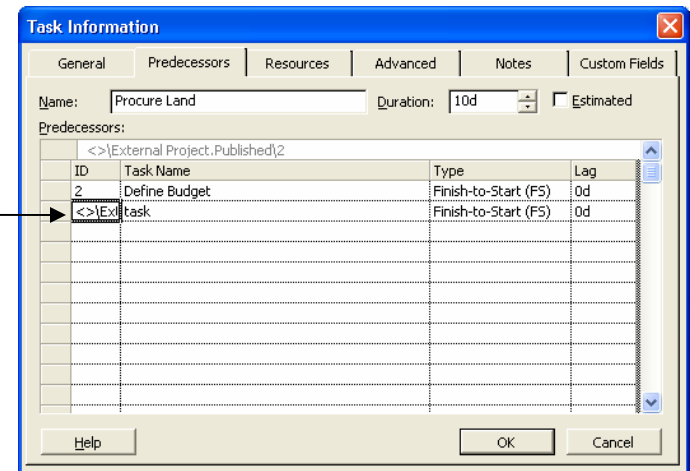
| | Fixed Work (Always effort driven) | Fixed Duration | Fixed Units (Default) |
|---------------------------|--------------------------------------|----------------|--------------------------|
| You change work | Duration changes | Units change | Duration changes |
| You change duration | Units change | Work changes | Work changes |
| You change assigned units | Duration changes | Work changes | Duration changes |



Interproject Dependencies

To create an interproject dependency:

- Open both project.
- From the Window menu, select Arrange All
- Select the successor task and open the Task Information box
- From the Predecessors tab of the Task Information box, in the ID column, type:
 - `<>\external project name.published\external task ID`



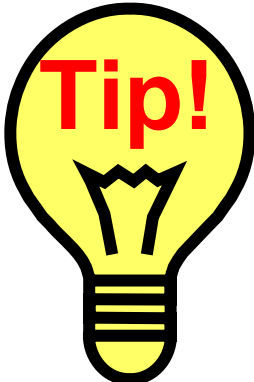
Baselines

- A 'snapshot' of the schedule that can be used to benchmark the accuracy of your initial estimates.
- Baselines can be saved for the entire project or just a selection of tasks.

When to Save a Baseline?

- When you (the Project Manager) are comfortable that the project has been:
 - Sufficiently scoped (Work Breakdown Structure)
 - Sufficiently estimated
 - Sufficiently resourced

Baseline Data

| | |
|---|---|
| Task information (Gantt Chart View) <ul style="list-style-type: none">•Start and finish dates•Durations•Work•Costs•Timephased work•Timephased costs | Resource information (Resource Usage View) <ul style="list-style-type: none">•Work•Costs•Timephased work•Timephased costs |
| Assignment information (Task Usage View) <ul style="list-style-type: none">•Start and finish dates•Work•Costs•Timephased work•Timephased costs |  <ul style="list-style-type: none">• You can save up to 11 standard baselines.• A baseline can be reset. |



Risk Analysis using @ Risk

- @ Risk for Microsoft Project (www.palisade.com)
- Uses Monte Carlo Simulation to show possible outcomes for a project and the likelihood of them happening.