In the beginning was THE PLAN.
And then came The Assumptions.
And The Plan was without substance.
And The Assumptions were without form.
And darkness was upon the face of the Workers.
And they spoke among themselves, saying,
'It is a crock of s--t, it stinks.'
And the workers went unto their Supervisors, and said,
'It is a pail of dung, and none may abide the odour thereof.'
And the Superv[illegible]rs went unto their Managers, s[illegible]
'It is a co[illegible] of excrement, and it is such that [illegible] bide it.'
And the Managers w[illegible] Directo[illegible]
'It is a vessel [illegible]
And th[illegible]tors spoke [illegible]
st[illegible]
And the Dir[illegible]
'It [illegible]
And [illegible]
And the President looked [illegible] that it was good.
And The Plan be[illegible]
And that is how [illegible]

Hyvää päivää, Hello, Guten Tag, Sawubona, Γειά σου, Kia ora, Wes hāl, Здравствуйте!, Grüezi, ¡Hola!, Goddag, nuqneH, 今日は, नमस्ते Bon Jour, おはようございます, God dag, Доброе утро, صباح الخير, Grüß Gott, God morgon, Dzien dobry, Bom dia, Hey-Hey, Goedemorgen, G'day,

Grant me the serenity to accept the things I cannot change. The courage to change the things I cannot accept, and the wisdo[illegible] to hide the bodies of those I [illegible] kill today because they g[illegible] nerves. And also, help [illegible] careful of the toes I step on they may be connected to the fe[illegible] have to kiss to[illegible]

And help me to remember... W[illegible] having a really bad day, & it see[illegible] people are trying to wind me up that [illegible] 42 muscles to frown, 28 to s[illegible] extend my arm to smack someo[illegible] Help me to always give [illegible] 12% on Monday 23% on T[illegible] Wednesday 20% on Thursday 5[illegible]

"You must be a biologist" said the balloonist. "I am," replied the man. "How did you know?"

"Well," answered the balloonist, "everything you told me is technically correct, but I have to idea what to make of your information, and the fact is I am still lost. Fra[illegible], you've not been much help so far."

The man h[illegible] responded: "You must be a project manager."

"I [illegible] plied the balloonist, "but how did you know?" "Well", [illegible], "you don't know where you are or where you're going. You have risen to where you are due to a large quantity of hot ai[illegible] made a promise to someone that you [illegible] how to keep, and you expect me to solve your problem. The fact is, you are in exactly the same position you were in before we met, but somehow it's now my fault!"

A woman in a hot air balloon was lost. She reduced altitude and spotted a man below She descended a bit more and shouted "Excuse me , can you help? I promised a friend I would meet her an hour ago, but I don't know where I am."

The man replied: "You are in a hot air balloon hovering approximately 30 feet above alkali desert scrub habitat, 2.7 miles west of the Colorado River near one of the remnant populations and spawning grounds of the razorback sucker."

Task force to review. : Seven people who are incompetent at their regular jobs have been loaned to the project Not well defined at this time. : Nobody's even thought about it. Still analysing the requirements. : See previous answer. Not well understood. : Now that we've thought about it, we don't want to think about it anymore.

Essentially complete: It's half done.
We predict... : We hope to God!
Serious but not insurmountable problems. : It'll take a miracle...
Basic agreement has been reached. : The @##$%%'s won't even talk to us.

To follow up to see if the thing h[illegible] done; to enquire why it has not bee[illegible] who did not do it; and to think up [illegible]

To follow up a second time to see if the thing has been done; to discover that is has been done incorrectly; to point out how it shall be done; to conclude that as long as it has been done it might as well be left as it is; to wonder if it is not time to get rid of the person who cannot do a thing correctly; to reflect that in all probability any successor would be just as bad, or worse.

And then:

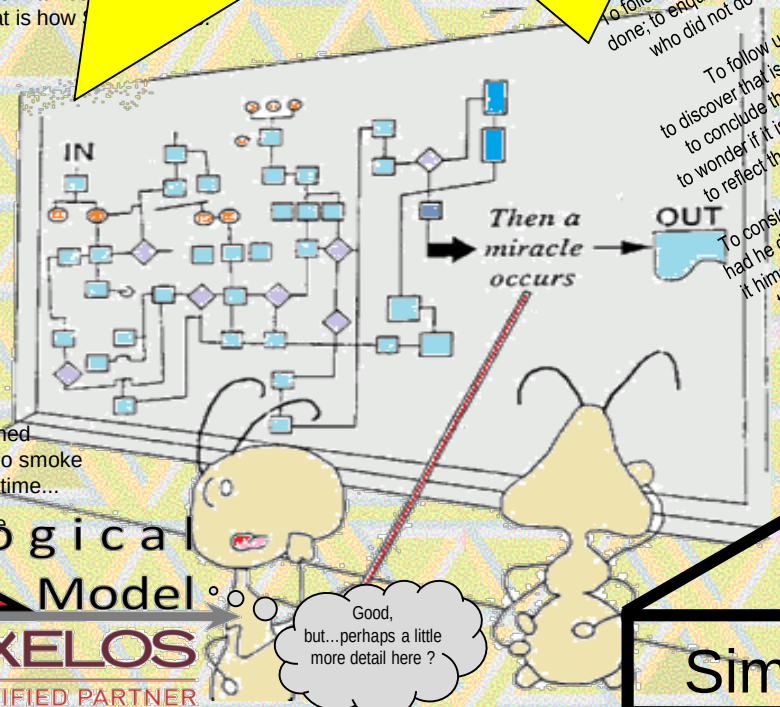
To follow up a second time to see if the thing has been done; to discover that is has been done incorrectly; to point out how it shall be done; to conclude that as long as it has been done it might as well be left as it is; to wonder if it is not time to get rid of the person who cannot do a thing correctly; to reflect that in all probability any successor would be just as bad, or worse.

And finally:

To consider how much more simply and better the thing would have been done had he done it himself in the first place; to reflect satisfactorily that if he had done it himself he would have been able to do it right in 20 minutes and that as things turned out, he himself spent two days trying to find out why it is that it has taken somebody else three weeks to do it wrong.

To realise that such an idea would have a very demoralising effect on the project team, because it would strike at the very foundation of the belief of all employees that a project manager has nothing to do.

Slip: Being first at the bar
Float: Remaining Beer kitty
Milestone: Paul buys a round



Results are promising : Turned power on and no smoke detected -- this time...

[illegible]lements will be [illegible] in [illegible] [illegible] re [illegible] [illegible]

Managing Projects with MSPJ & EV

Project Series Skills

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Simon Harris, PMP, CGEIT, IPMA-D, P2

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Links To Other Evaluation Course Materials

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- The following courses are on http://learn.logicalmodel.net/
- A short introduction to a structured PM framework with tools & techniques for each step for people with a day job who need a useful basic toolkit
- #pm_ngt – A New generation of thinking because success in business needs more than just project management thinking. #pm_ngt integrates D4®, PRINCE2®, PMBoK-G® & Agile, Lean and 6σ but not the kitchen sink
  - One-Intro to The Holistic Approach and
  - Two-ValueFlashpoints to Backcasting and
  - Three-Product Breakdown to Estimates and
  - Four-Dependencies Critical Path to Schedule to Risk to Baselines and
  - Five-Sanction To Execution and Earned Value & Delivery and Program Office here.
- A Master Class in how to use MS Project including for Earned Value
- Advanced courses - Delivery of Value from change (‘cos it isn’t just project management)
  - Leading Complex Projects (complete but undergoing a revision to add more discussion of self-awareness in the Complex Adaptive Leader)
  - Assessment & Recovery of Troubled Projects
  - Estimating for Agile (& Other) environments
  - Master-Class in Risk Management
  - PRINCE2® exam-cram and PRINCE2-Agile® exam preperation
  - Draft PMBoK exam prep revision aid – pending release after PMI REP application processed
  - Project Governance

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- By Simon Harris, PMP, CGEIT, IPMA-D & PRINCE2® reg'd

Master-Class in Really Managing a Project using Microsoft® Project and Earned Value Analysis

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The Course's Purpose

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- This course owes its existence to my frustration at 1,000 page books that tell you almost nothing about how to run a project with Microsoft® Project (MSPJ)
  - My analogy is that the manual that comes with a new car tells you how to turn on the headlights but not how to drive the car to get the groceries
- I have attempted to integrate project parallels to 'getting the groceries', 'driving the car', 'being safe (having the lights on and seeing where you are going)' in this course
  - In project terms that is 'being able to define project objectives', entering the resulting breakdown structure, task dependencies and resource needs to plan achievement of objectives and then tracking achievement and replanning remaining steps until completed
- My mistakes: seeing everyone's perspective and thus realising what isn't obvious to others (or seeing what, with some distance is obviously an error) is impossible. IE this contains errors, flaws & weaknesses: tell me via MSPJ@logicalmodel.net and I'll fix them
- The course was written to be instructor led (more details later). Hopefully it is of value as self-study
- Please pass a copy or a link on to those you think would find it useful - thanks

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• Some of my thoughts as expressed in this work were refined in discussions I have had while on assignment for Atlantic Management Centre International (AMCI) Ltd. I thank them for agreeing that, where representation of ideas have merged and been shared, AMCI is content this acknowledgement discharges any obligation to them.

Domestics

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Some pages numbers are omitted – it isn't an error it's my means to insert pages later without renumbering everything afterwards

Navigation Central

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- The ‘Home’ button brings you straight back here!

- The ‘Return’ or ‘GoBack’ button steps back to last slide visited
  - That may be non-sequential (It also doesn’t work in all tools – eg pdf & in some (iSpring) it chains back n back n back)
  - Its useful after hitting ‘Home’ to return to where you where

- These buttons take you to each module’s start

Intro	1	2	3	4	5	6	7	8	9	10

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To Get The Best From The Course…

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- Stop me <u>when</u> you "lose it": You cannot focus all day
  - We will take frequent breaks
- There are no dumb questions: Ask questions as we go whenever you want to
  - Everyone has a Mulligan (or 10)
- If you're frequently 1st to answer questions then slow down, add your view after you've heard from others (you'll learn more)
- If anything is amiss give me feedback before the end, so I can fix it
- Your contributions: If you disagree please ARGUE!
  PjM is too complex for one opinion to be correct
- What is said in the room stays in the r
- Be on time

Since you are reading this version the best way for self-study may be to find a pal and do it as a pair, Do a chunk each day (perhaps at a pre-set time), Skim over the whole thing to get the structure (which is described soon) before working through methodically, Don't get stuck on topics that are hard when first encountered, skim them and return to them later (a 2nd or 3rd look is often easier to assimilate), Use a copy of MSPJ to really practice hands-on as you go (you can download a 60-day trial from Microsoft®) , Re-Skim earlier lessons after completing latter ones Skim the whole thing after you have finished and monthly or quarterly after that (make a diary reminder)

MSPJ is a complex tool, PjM is a tough topic, this is a dense information source, be prepared to spend effort, recognise your progress is an achievement worth money in the pay-packet ☺

Using the Course

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- Your learning will be best if you continually try the capabilities as they are explained
  - Frequent interludes and exercises are included for experimenting
  - When basic skills are developed a complex case study is fully planned and tracked through 7 months of EV
  - The case-study evolves through out the course from entry of scope and resources through development of multiple baselines and tracking of progress and problems.
- All the MSPJ topic areas link directly to the supporting project management (PjM) skills taught in our pre-PMP level PjM courses
  - Our post-PMP level courses use complex adaptive systems principals: they depend on the foundations of good scope, cost and time management but are not MSPJ based

Objectives

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- The course is intended to make you able to
  - Link REAL project management* to use of a typical planning tool
  - Navigate the Microsoft® Project® (MSPJ) landscape
    - Understand MSPJ's concepts, elements and how to usefully combine them
    - MSPJ has so many options my true aim to show you how to explore them
  - Create project base-lines in Microsoft® Project®
    - Set-up the project's calendars
    - Enter tasks with dependencies, enter resources with costs
    - Link task and resources into smoothed and levelled schedules
  - Track actual project progress against the base-line
    - Analyse and report project status, including using Earned Value
  - Amend project records to reflect intended responses to project status

*REAL means the pragmatic actions needed for managing a project in the politically driven working world where things happen incompletely and out of sequence rather than the neat, sequential, complete class-room exercises: see next slide

Contents

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- Lesson: 0 - Introductions and logistics
- Lesson: 1 - Understanding what we can and can't see in MSPJ
- Lesson: 2 - Project Management context & the whole software based journey
- Lesson: 3 - Setting up the project in MSPJ
  - Adding project and tasks information
- Lesson: 4 - Building the network with dependencies
- Lesson: 5 - Entering resources and assigning resources to tasks
  - Resources, calendars and MSPJ's opaque scheduling logic
- Lesson: 6 - Finalising the schedule and presenting the baseline
  - Critical path, resource loadings and some reporting options
- Lesson: 7 - Tracking progress and amending assignments
  - Reporting with earned value and MSPJ reporting tools
- Lesson: 8 - Tracking the case study
- Lessons: 9 & 10 - Topics we have not covered & Summary and evaluation

A Chapter by Chapter Explanation of The Course's Structure 1/8

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- Understanding What We Can and Can't See in MSPJ (circa 2 dozen slides)
  - Explanation of the multi-level 'sparse' relationships MSPJ holds internally between task, resources and time-line/ time-phased data
  - Details of how to display the data and relationships using views and tables, including customising what is displayed
  - How to record macros for repetitive tasks
  - How to access the 'Project Guide' and the Help system's important parts
  - Discussion of the need for standards as MSPJ's flexibility creates its own problems

The Course's Contents Described 2/8

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- Project Management Context For Software Tool Guidance (about 2 doz. slides)
  - The link to 'real' project management activities of socially oriented planning
  - A worked example of the FULL MSPJ planning and tracking life-cycle
    - While it lacks exploration of all the flexible options it is a cradle to grave illustration and context for the following 400 slide expansion of the process
    - This is where we really start to get hands on with the software (about slide 60)

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The Course's Contents Described 3/8

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- Setting Up The Project in MSPJ (3 doz.)
  - Project management context
  - Defining the project, setting calendars
  - Modelling scope
  - Links to WBS, PBS, OBS, CBS…
  - How to select work-space elements
  - Moving, inserting & deleting tasks, using summary tasks
  - WBS coding, outline codes & lookup tables

The Course's Contents Described 4/8

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- Building The Network With Dependencies (4½ doz.)
  - The link to PjM activities of social, people centric planning
  - Creating & changing dependencies
  - Using hammock tasks and managing scheduling constraint
  - Entering task details and time quantities
  - Coping with effort driven, fixed duration, units or work
  - Case Study session to 'transcribe social planning's outputs' for the Lunar Imaging System's (LIS) dependencies to a Network Diagram with-in MSPJ

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The Course's Contents Described 5/8

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- Entering Resources and Assigning To Tasks (6 doz.)
  - The link to 'real' PjM
  - Creating Resource Pools and assigning resources
  - Understanding MSPJ's 'Task Type': What it means to define a task as 'Fixed Duration' or 'Fixed Units' or set it to be 'Effort Driven'
    - The start of explaining a topic that frustrates people: MSPJ breaks a cardinal rule of HCI* design "Never change the operation of the interface without notice"
    - MSPJ treatment of tasks changes when the last of effort, duration and resource is applied – once you appreciate this issues may dissolve (or at least melt a little!)
  - Task Usage & Assignment Usage sheets
  - Part 1 of Untangling the complexities of MSPJ's task-types when editing task effort/ duration/ resources (MSPJ matches the subject's needs appropriately)
  - Case-Study: Setting up LIS resources, their costs, calendars and holiday dates and assigning them to the LIS tasks

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* Human Computer Interface

The Course's Contents Described 6/8

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- Finalising The Schedule and Presenting the Baseline (4 doz.)
  - The 'real' PjM link: understanding the significance of the critical path (the value of 'float')
  - How to create the critical path and display float in MSPJ
  - Getting to grip with MSPJ's (1st element of) REAL POWER: Manual and automatic levelling of constraints in resource availability
  - Displaying cumulative costs
  - Adding risk to the baseline and using Monte-Carlo analysis
  - Case Study: Levelling the LIS project's resources for 'real-world constraints'

The Course's Contents Described 7/8

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- Resource Assignments Tracking Progress And Amending Assignments (4 doz.)
  - The 'real PjM' link: the point at which we move from mostly 'social planning' to mostly tool based resource manipulation
  - Deciding what level to track progress at: the choice between project level and detailed level
  - How to track at assignment level
  - Tracking costs and status and using filters (Part 2 of 'Untangling task-type complexities')

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The Course's Contents Described 8/8

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- Using Earned Value In MSPJ (3 doz.)
  - Earned value is 'free' in MSPJ as soon as a baseline is created!
    - MSPJ also allows calculation of staff member's EV! (scary but great for improving estimating and calculating bonuses [and firing non-performers*!]?)
  - The myriad of reporting options available
  - Using export (and import) facilities to move data, including Dynamic Data Exchange(DDE) EG between Excel and MSPJ (EG put the estimating data in Excel. Maintain it via EVM & it will adjust MSPJ values for effort & duration!)
- Tracking the Case-Study through 7 months of issues and progress (4 doz.)
  - The details of 'progress reports' to be entered to MSPJ and the results you could (should) get
- Course Summary (1/2 doz.)
  - Further reading, Summary & Evaluation, Where we started: Review Objectives

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*Why do so many sources of review and metrics guidance say "never use this to evaluate your people"?. It is naïve, your people will be evaluating themselves and each other. IMHO sage advise says "recognise the evaluation dimension and consider how politically sensitive it is and use the insight with great care"!

My Assumption

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- A typical reader of these materials should have
  - Real-world experience of projects
    - Not necessarily as project manager
  - Is probably PMP, IPMA-D or -C or PRINCE2® Registered practitioner or is at equivalent level
- My assumption is that you know ***why*** and ***how*** to use techniques such as work-shops and tools such as white-boards and Product Breakdown Structure (PBS) and WBS ***outside a classroom***, that you know what the critical path is, how to use float as a type of 'resource' & appreciate the need for 'levelling'
  - If you are unsure of how to follow the steps and use the tools noted above then courses covering those skills is available at www.logicalmodel.net. You need It, not this one first
  - If you are unsure of ***why*** to use these tools in reality then my white papers on the use of PBS/ WBS, 'Doing risk', Post-It™ planning and more can be found by search 'simon harris' on the web-sites of the American Society for The Advancement of Project Management and PM Today

PRINCE2® is a trademark of the OGC in the UK and other countries and they demand their recognition with this note on everything – bureaucracy!

Who Are We All?

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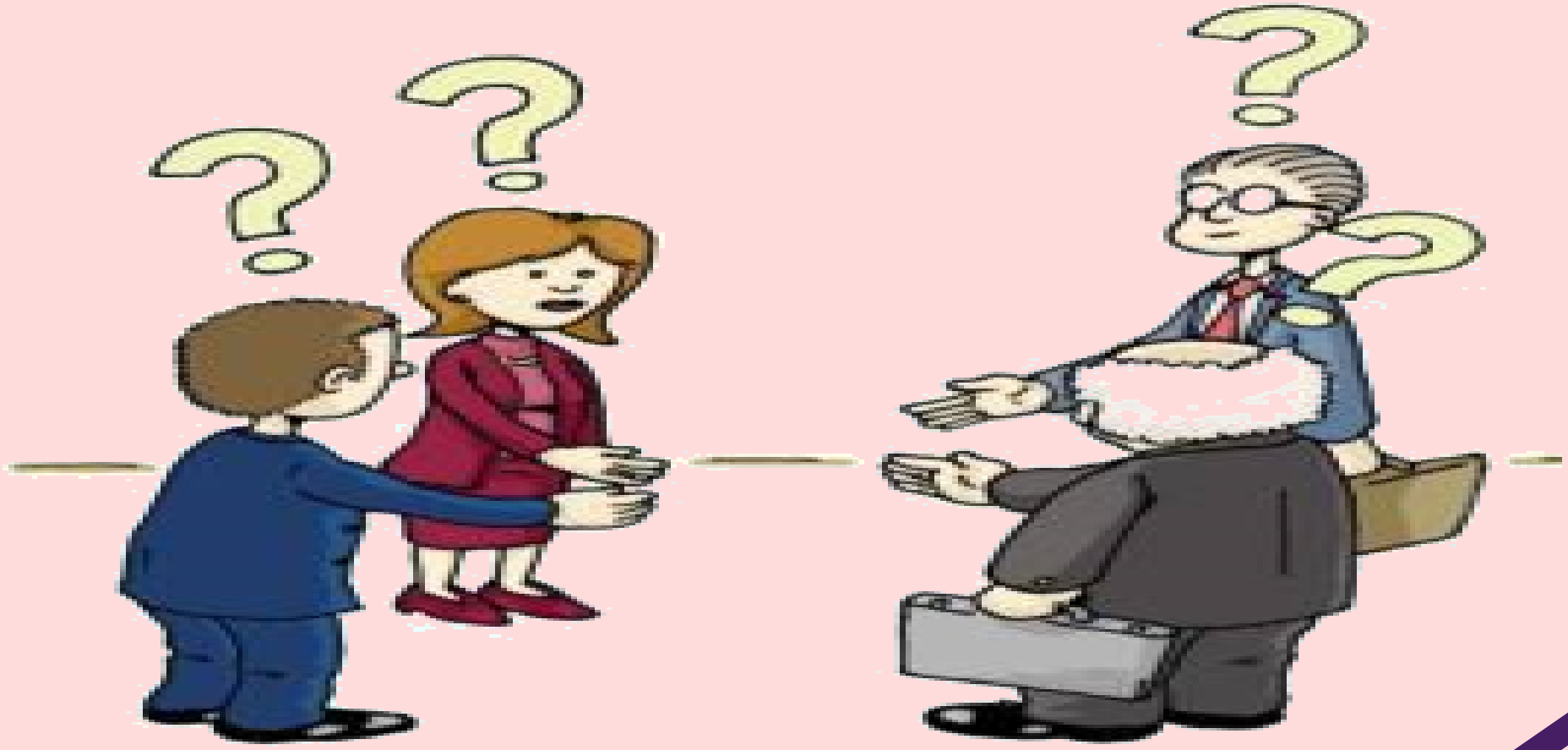
- Name, Role and Organisation: Telling others about yourself



Who Are Logical Model Ltd (LML)?

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- A niche consultancy that delivers training and consultancy around control and governance of project based benefits realisation
  - LML's purpose is to improve the project management state of the art through popularisation of what is common-sense (which I suggest is 'obvious after it is observed' not necessarily 'is widely-known')

- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project risk and quality management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® use in the real-world & PRINCE2® Exam preparation (but only if you insist on exams as we believe they create the wrong focus which ends-up destroying the value to a business)
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

This Course Version

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- This is a complete training course in how to use Microsoft™ Project®! for personal, individual development!!
  - No catches everything needed is within this file

- If you want to use this intellectual property as a commercial offering that's fine too as long as you cut me in ☺ I don't want much !!
  - Pre-arranged commercial use removes this notice, gives you animated slides that build procedures step-by-step, also step-by-step exercise files, instructor notes, suggested time-line for delivery and support
  - For non pre-arranged commercial use (IE where you charge a fee) I hereby offer you a contract to use this materials, without prior notice in a commercial context at £1,000 per day or per copy which ever is the greater (that's an 'offer' and notice of 'consideration', use will constitute 'acceptance' and forms contract) – as soon as I become aware of use I will start proceedings to collect fees due
  - If in doubt – Ask ☺
  - If you are in a commercial context (you paid outside our website or downloaded a torrent) and are reading this then I didn't get a cut. Let me know and I'll split what I recover with you

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- Lesson 1

Lesson 1: Understanding What We Can and Can't See in MSPJ

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Objectives

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- Understand what we see when we open MSPJ ☺
- Appreciate where planning standards fit with planning tools
- Understanding what we can't see
  - MSPJ's internal data model and data relationships
- Discuss how to follow the course notes while playing with the tool
- See the whole process for using MSPJ in 1 slide
- Learn to manipulate Views and Tables and Timescales
  - How to tailor what we see to match what we want
- Access the Help system
  - Find out what is different in later version of MSPJ
- Capture repetitive actions in macros and assign to a tool-bar button
  - Open files as copies (to circumvent single undo issues)

Opening MSPJ: Understanding What We See

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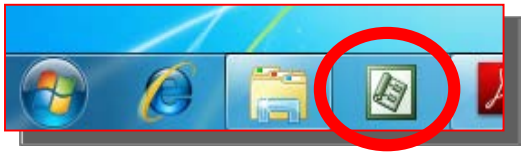
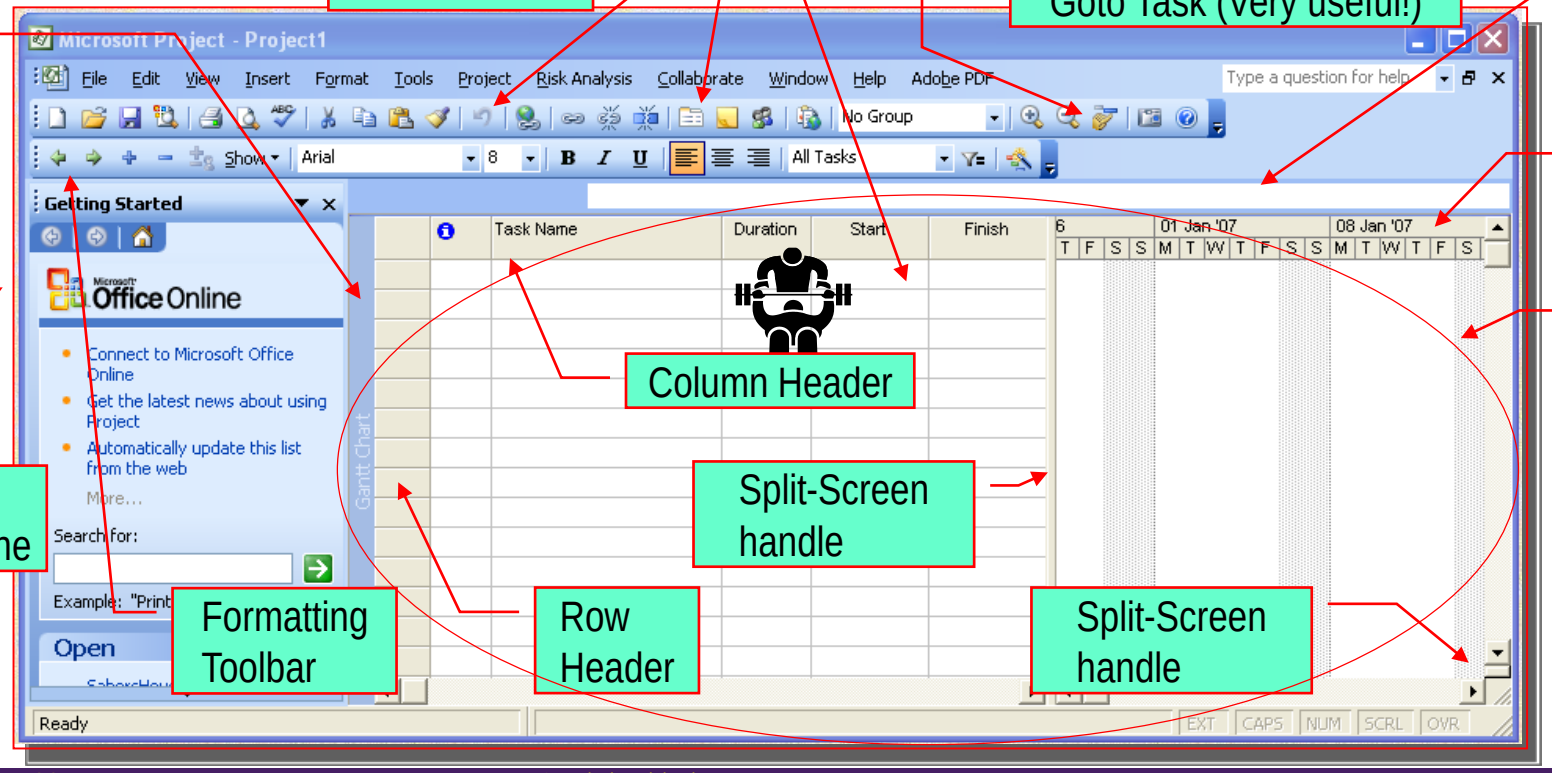
- Open the program by clicking the task-bar's MSPJ icon





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The way to learn this tool is play with it: But you can't watch two screens at once!

What Is Microsoft Project (MSPJ)? What We Can't See

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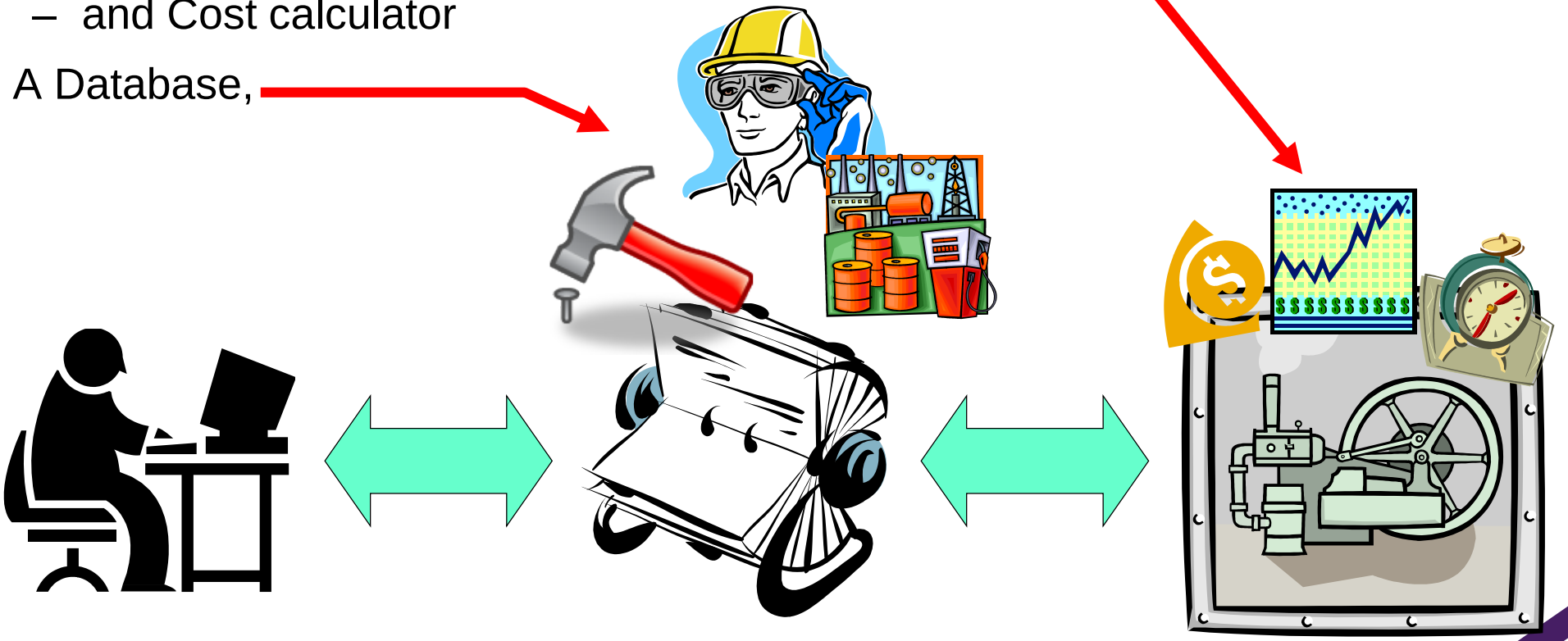
- A Display (& Reporting) Interface
- A Scheduling engine
  - and Cost calculator
- A Database,



Time View

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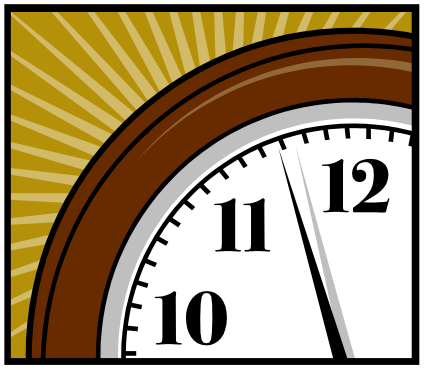
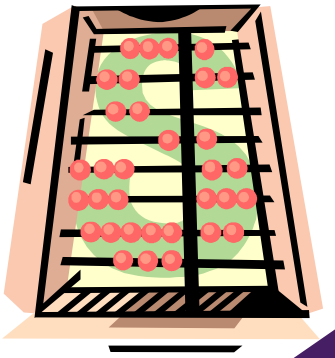
- MSPJ's view of the project is "as at now", it is a "this minute" view
  - No history or audit trail is maintained of the evolving project status
  - You can save snap-shots: MSPJ provides 11 baselines & 11 'interim plans' (Task Start/Finish dates)
  - You can "set now" as any date you like for data entry



- What you see is always the result of all edits and calculations made to the MSPJ database so far
  - Many calculations are performed "now" (EG EV) without explicit request
  - Some may be set to be performed on request (EG levelling!)
  - The total set of calculations can be set to be "on request"
  - Changes made by calculations often invisible* (& wrong)



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*MSPJ 2007 and later provides enhanced facilities to high-light changes made by MSPJ and multi-level undo. Read the product details and you will see 2007 & 2010 are mostly about new fonts and colours: 80% froth 20% substance.

The Data Hierarchy

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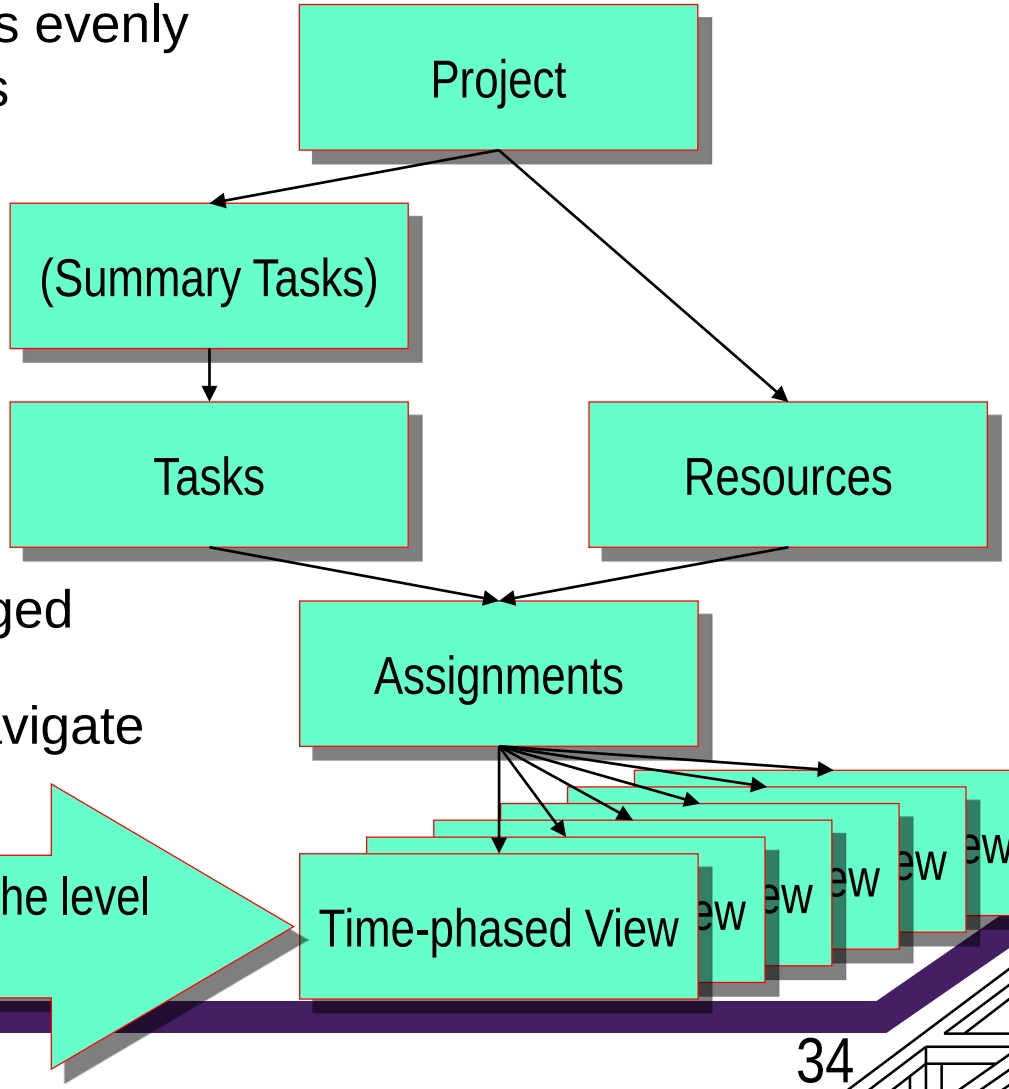
- Any assignment data that is entered is evenly spread when viewing any lower levels
- Any assignment data that is entered is aggregated when viewing any higher levels
- The relationship between duration, effort (*Work*) and assigned resource (*Units*) is reapplied to calculate one term whenever another term is changed
- The relationships are often hard to navigate



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Data Relationships

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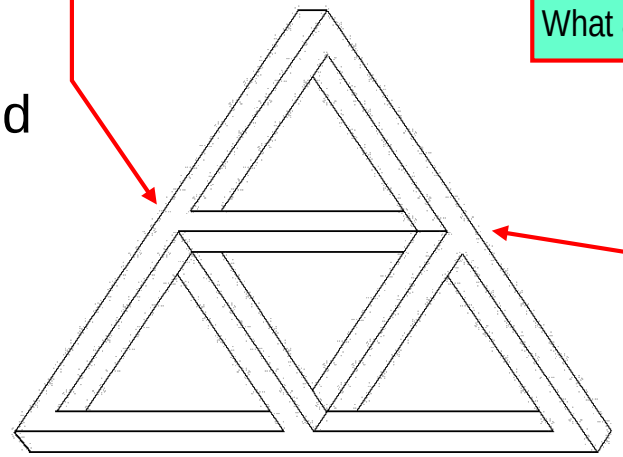
- MSPJ starts and keeps a link between *duration*, *resources* and *work* data
  - Initially the third is calculated from the first two entered
  - MSPJ maintains a triangular relationship AFTER work-load, duration and resources are specified
    - Change to one factor causes recalculation of one of the other factors



  - Not all task durations vary based on the resources assigned
    - Tasks that change duration if resources change are '*Effort-Drive*' aka *Fixed-Work*

MSPJ's Flexibility Is A Source Of Problems

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- MSPJ's power and flexibility means standards must be applied if consistent results are to be achieved
  - Everything you want to do can be done in 6 ways (at least)
  - Every way has different side-effects and consequences for later steps
  - Many key information needs are not explicitly spelt out
- Was MSPJ created by programmers? Surely not by project managers!
  - *EG-1* 'start on' projects are scheduled ASAP while 'finish by' are scheduled ALAP by default
    - ALAP is great for JIT (Just in Time procurement)
    - Bad (worst?) approach for deadline driven projects that MUST 'finish-by'
  - *EG-2* Duration not *Work* is included in most data entry tables and forms
    - In most cases duration should be derived from work / resources!
- More as we explore (MSPJ versions after 2003 have options to be 'dumber')

Conundrum

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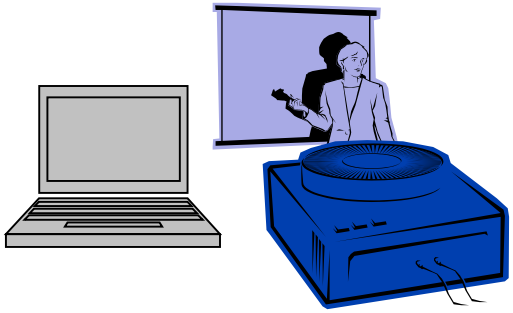
- You must try-out what we talk about as we go
  - Learn by playing

- You can't look at two screens at once!
  - Follow what is on the projector and try on the lap-top
  - Ask for things to be repeated!



- Working in pairs is to encourage discussion and reinforcement
  - It isn't to economise on hardware!!

- Software isn't the latest version because:
  - MSPJ has been getting "friendlier" but not really more capable
  - What we cover is always upward compatible
  - Typically organisations are a mix of versions
  - Few people buy the latest upgrade just because it is released

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New Versions

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- 2007 adds
  - Multi-level undo!!,
  - Change Hi-lighting!!!
  - Ease of use enhancements to many standard capabilities
  - Lots of Project Server enhancements
- 2010 adds
  - 'User controlled scheduling'
    - Because people find auto-schedule too hard to control
  - Support for top-down and incomplete planning!
  - Team planner with swim-lanes!!!
    - The beginning of the end for Gantt charts – at last ☺
  - Ribbon user interface and other 'easier/ faster' user interface tweaks ☹
  - Easier fancy formatting

The Steps To Create The Baseline

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- Either 2. or B. or any of the detail of 1 could follow "Create a project file"

1) Create a project file (open MSPJ or click File | New)
   - Set project start date (details of all steps soon)
   - Set working time calendar
   - Create customised calendars
   - Set defaults (hours per day, charge rates etc)

2. Enter the list of tasks
   - Link tasks for dependencies
   - Enter work (effort) required*

B. Link to or Enter the list of resources
   - Set customised resource calendars
   - Set staff and equipment rates
   - Set material costs

iv. Link Tasks and Resources
   - Set customised task calendars
   - Correct MSPJ's guesses at duration and work

v. Display the Critical Path and Resource Over or Under use
   - Reschedule or re-assign work to fit available resources

vi. Save a baseline (Enable Earned Value Assessment)

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*MSPJ's creators show in many places a mind-set that duration is the start point for the triangular scope-resource-duration relationship

MSPJ Database and Views

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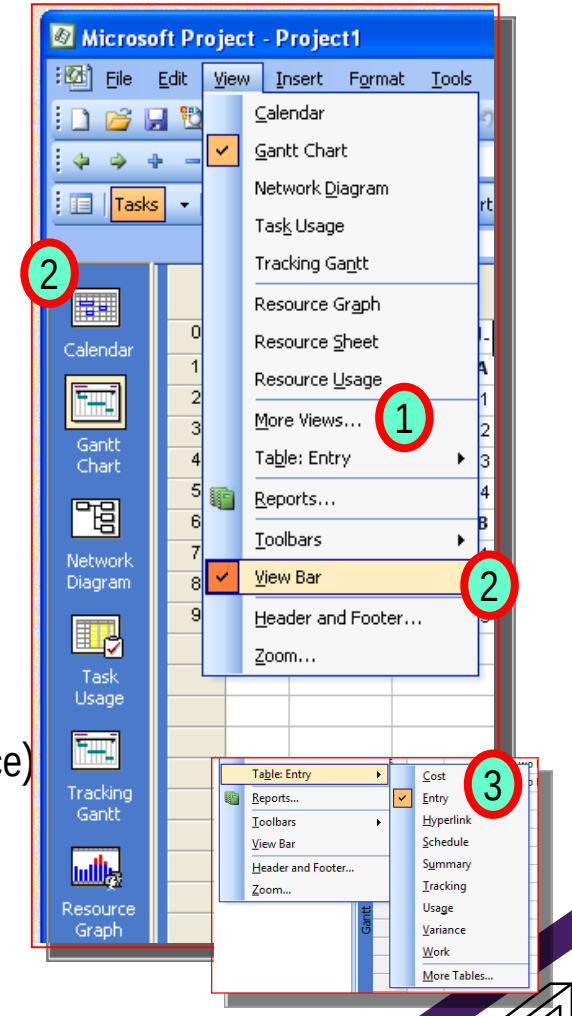
- MSPJ's Project file is a database – it contains:
  - Entered, calculated, aggregated and distributed information for tasks, resources and assignment
- The workspace displays a 'view' (25 default options)
  - Views select and format information from database records
    - Views may be a sheet containing a table (containing rows & columns) or graph or a form or a combination
    - Forms and tables are used for data entry as well as display
    - What a view shows can be filtered, grouped, sorted and reformatted, also added to, reduced or rearranged

1. To see the full set *View | More views*
2. For a permanently on-screen list *View | View Bar* (Not my preference)
3. *Table menu* displays 8 tables commonly needed in context
   - To add others *View | More Views | Select | Edit | Show In Menu*
   - Set the default with *Tools | Options | View-tab | Default View*



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Accessing & Changing Views & Tables 1/2

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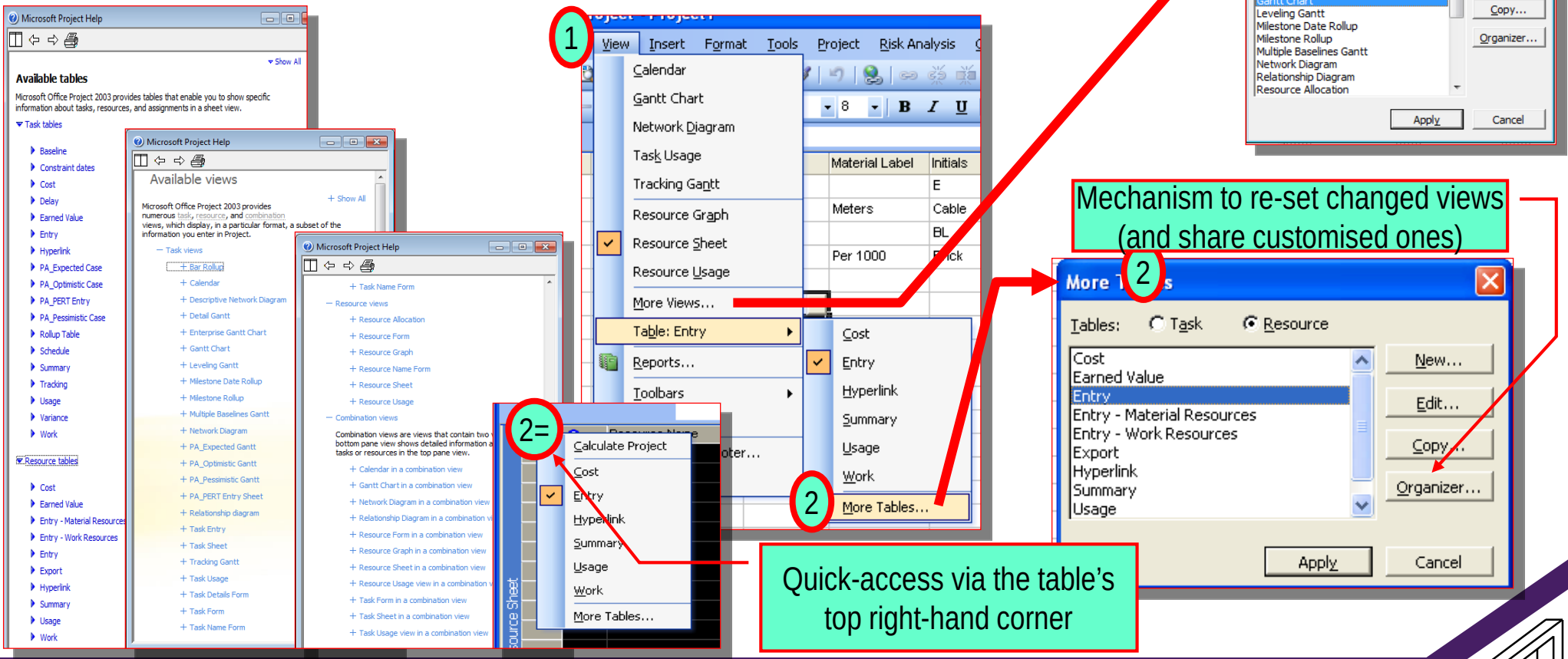
- Views provide pre-made collections of tables & graphs & forms
  - Tables are ready-made collections of columns



Accessing & Changing Views & Tables 2/2

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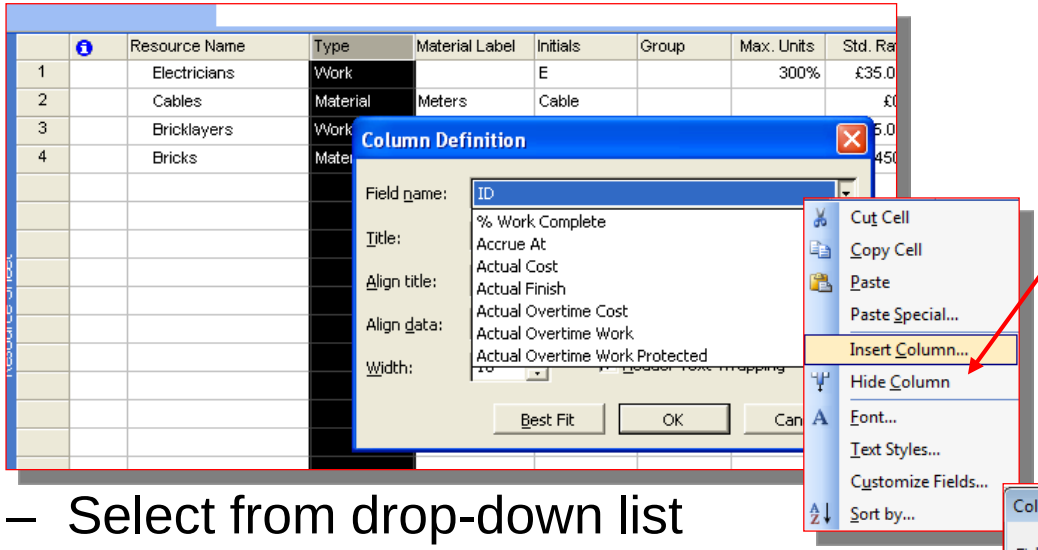
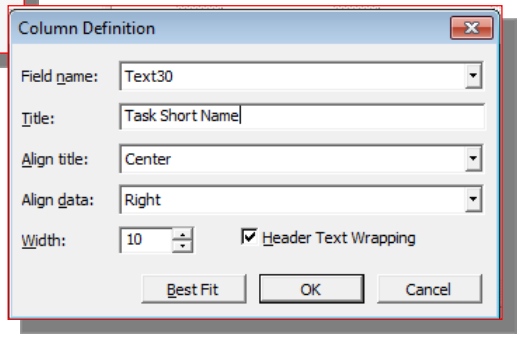
- You can add (delete) your own columns and tables
  - *Right-Click* a column heading



Remove a column by highlighting it and hit Delete
or Right-Click and Click Hide Column
Or drag its width to zero
Removal is only from the display
NOT the database!

  - Select from drop-down list
  - Provide title, width and alignment



- Edit columns by *double-clicking* their header
  - Change column's title and or contents

Changing Tables

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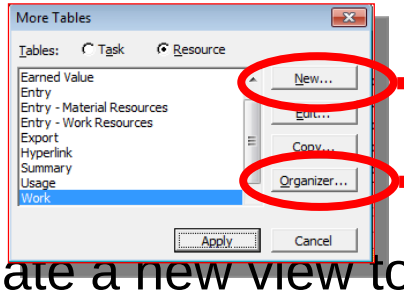
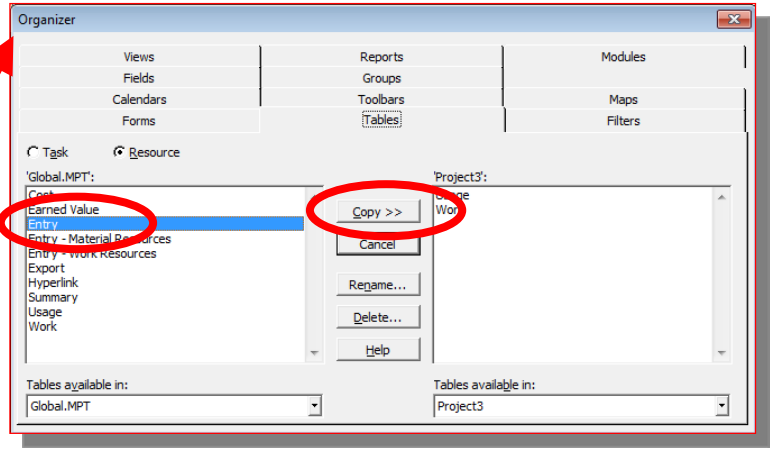
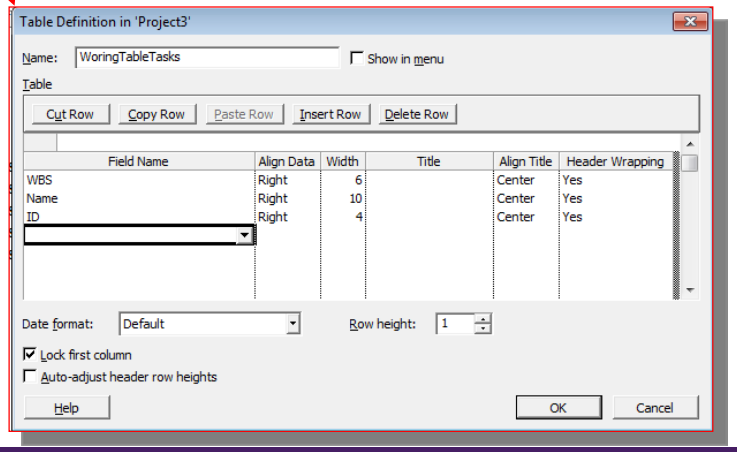
- Any time that you insert, resize or delete a column it affects the definition in the project-file!
  - Reset by copying from the Global.MPT*





- Create a new view to apply edits to?
  - Needs 3 columns to enable 'insert before'
  - I call mine TailoringTable**
- *View | Tables | More tables... | Export* is nearest you can get to a 'complete' view



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* Recall the route to show this window is 'View | Table: SomeName | More Tables'

**See any of the course practice files. I (try to remember to) modify this view rather than the default views such as Task-Entry

Setting Appropriate Time-Scales

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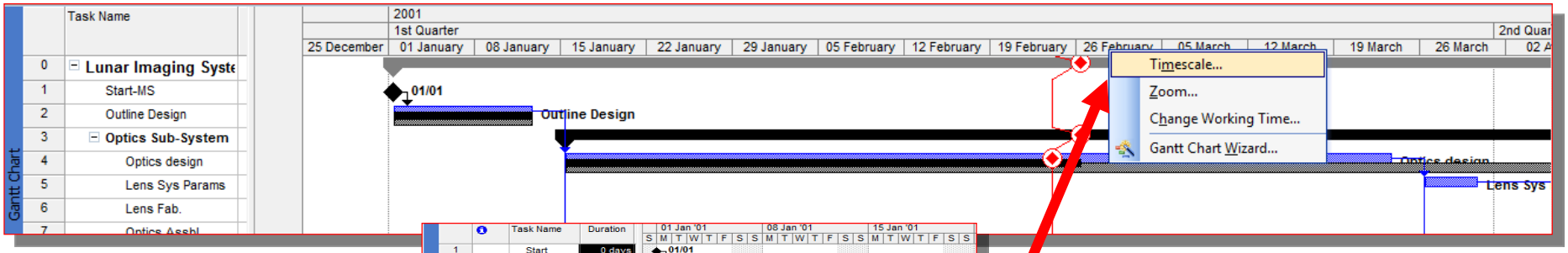
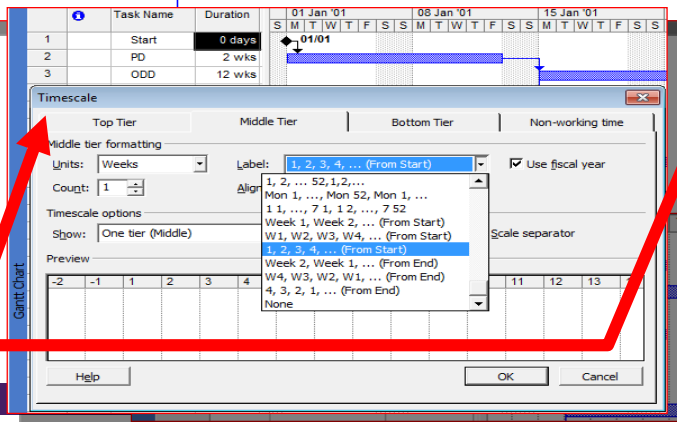
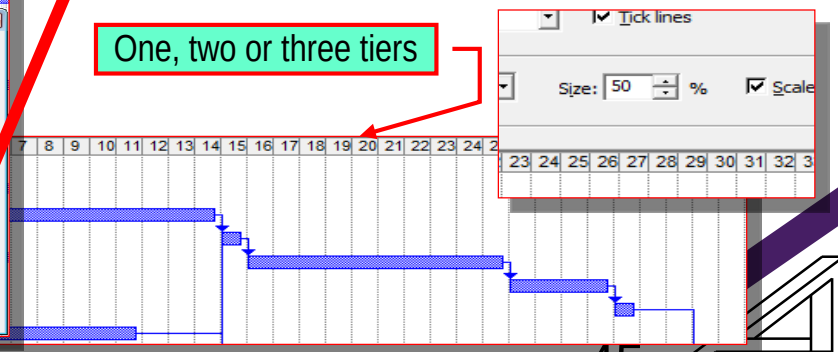
- Assignments of resources to tasks are time-phased (have a start and a duration)
  - When tasks & resources have been entered to the MSPJ database then resources can be assigned to tasks
    - May need to configure the work-space's time-scale at this point
    - Timeline can have three levels of labelling



- *Right-Click* the timeline | *Timescale…* for options





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Some Automation

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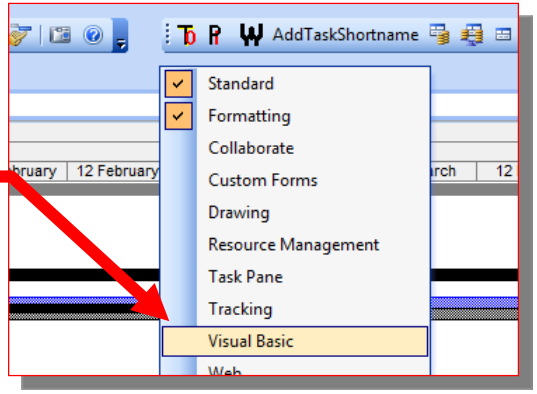
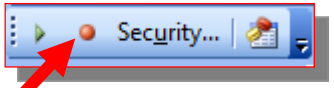
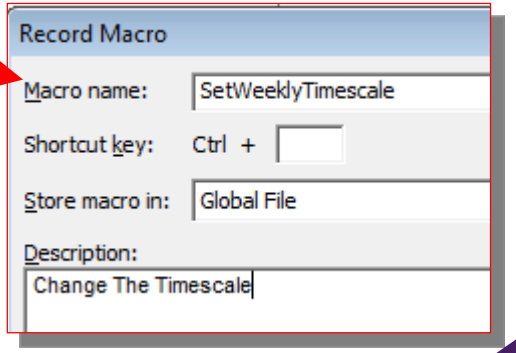
- MSPJ includes Visual Basic for Applications and 2003 has a 'macro recorder'*
  - Recorded (& hand-written) macros easily assigned to toolbar buttons

- *Tools | Toolbars | Visual Basic* or *Right Click toolbar background*



- Enable the *Visual Basic* tool bar
  1. Click the red *Record* button
  2. Give the macro a name
  3. Perform required action
  4. Stop the recorder
  5. Open any toolbar
  6. Select the macro and drag to the tool bar
     (Detail on next few slides)





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*MS committed a heinous crime and removed the recorder in 2007 and 2010 versions

Example Macro on A Button: Set Timescale 1/2

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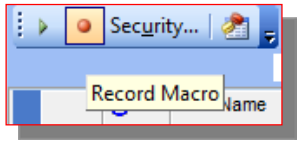
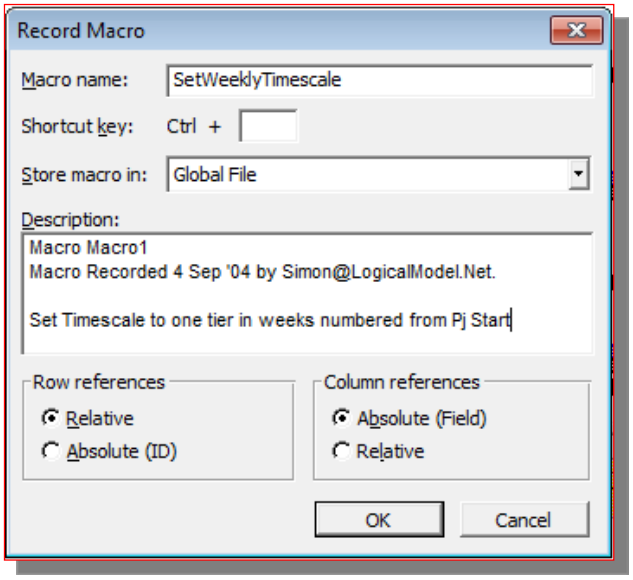
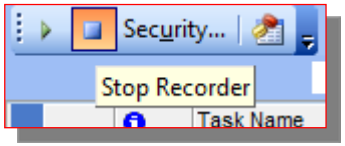
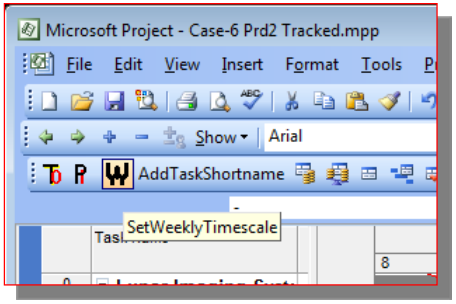
- My preferred view is to show the project timeline in weeks
  - Numbered from Project-Week-1
  - Setting this on every change of view is an annoyance
  - A solution is to assign the operations to a button on a toolbar









Example Macro on A Button: Set Timescale 2/2

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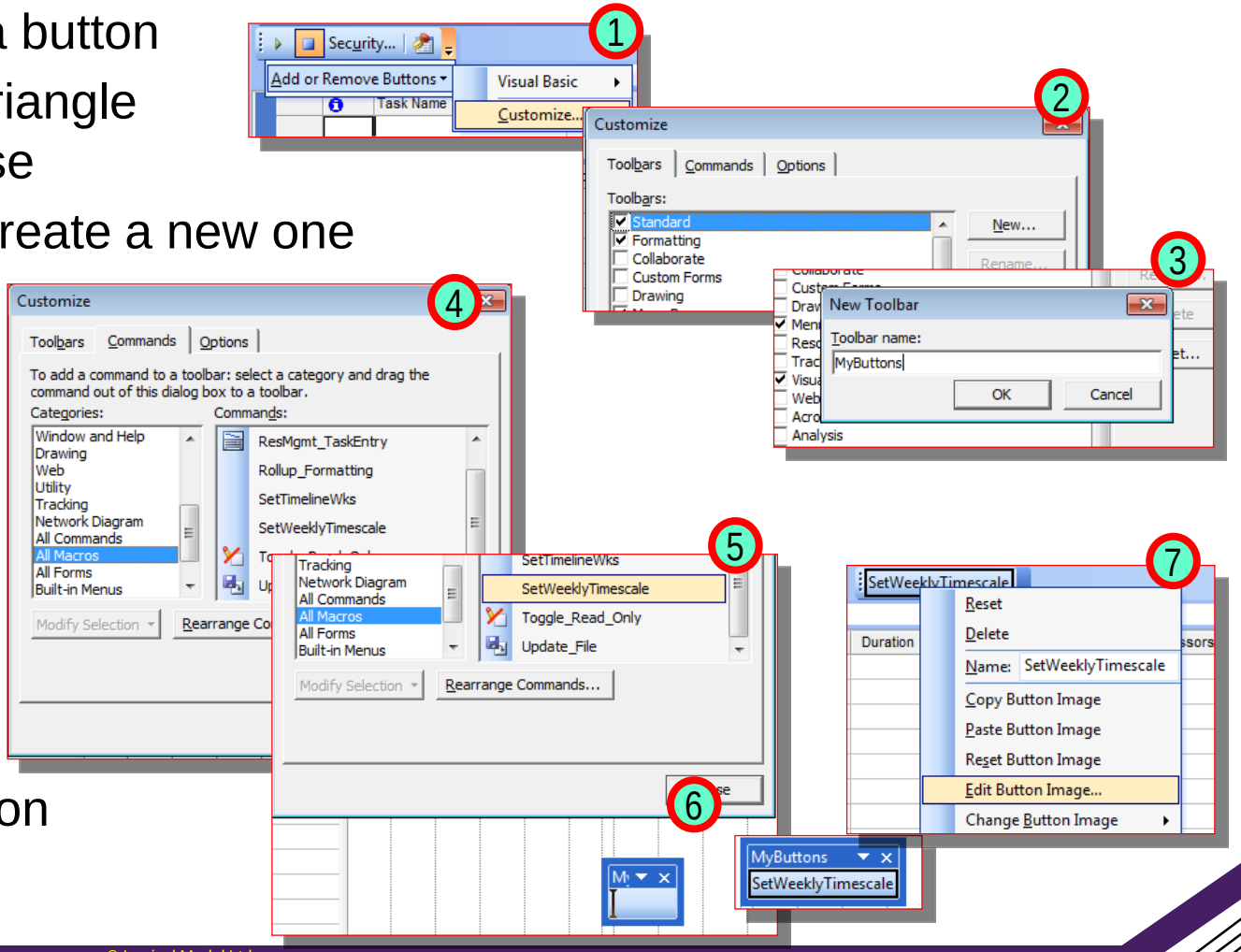
- Next put the macro on a button
  1. Click any toolbar's triangle and select customise
  2. 3. Select a toolbar or create a new one
  4. Select the *Commands-tab* and scroll to *All Macros*
  5. 6. Drag the macro to the toolbar
  7. Right-Click the new button and 'draw' a button image if desired



Project Guide & Help Pane

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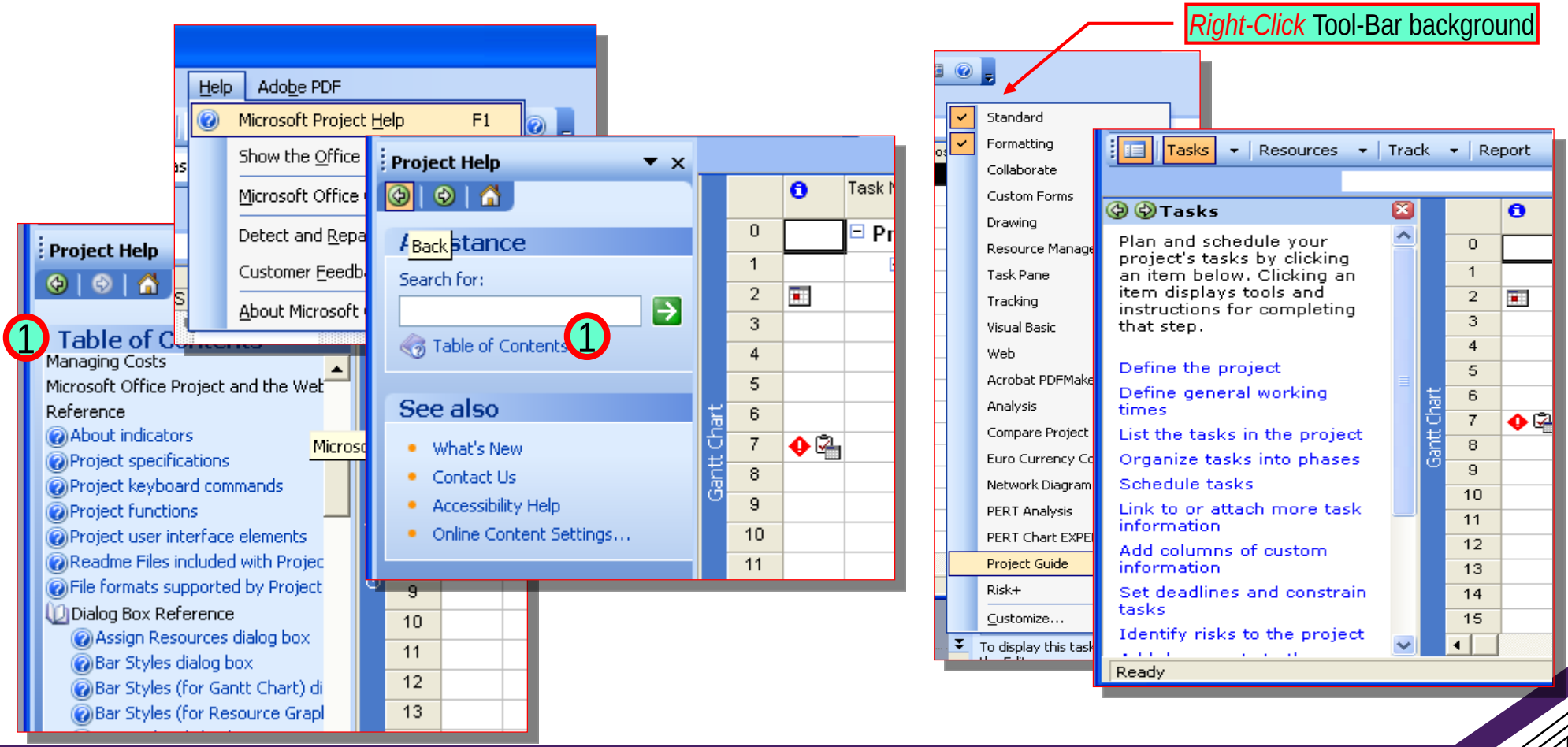
- Many activities can be aided by Help & the Project Guide



Help's Reference Section Explains Fields (and More)

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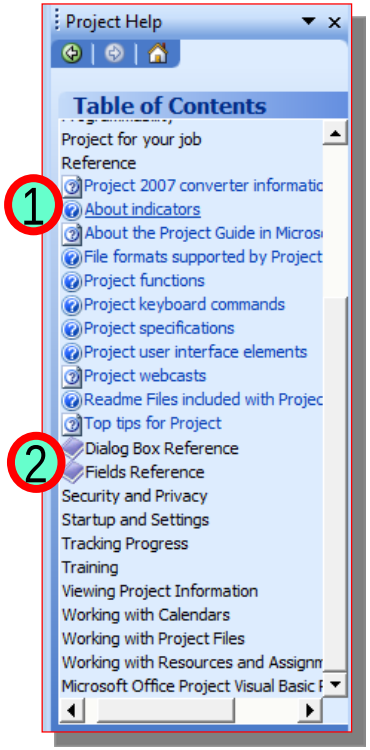
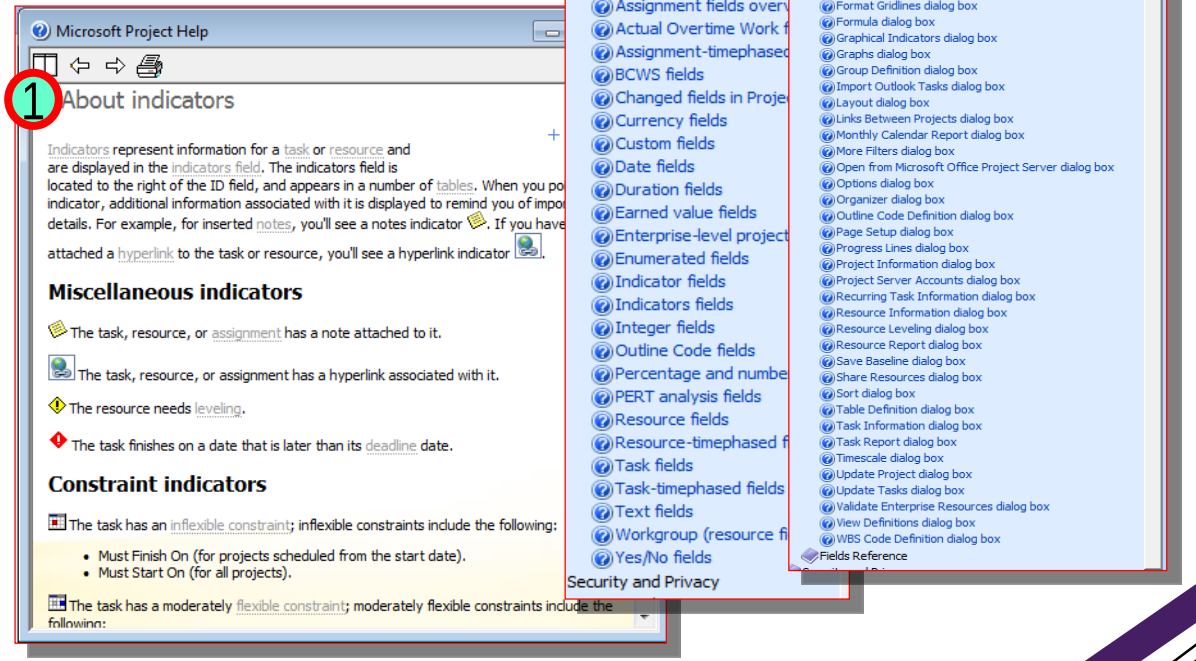
- Key elements of help are *Help | Table of Contents | Reference | …*
  - Indicators
  - Dialogue and Field reference





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Saving and Opening

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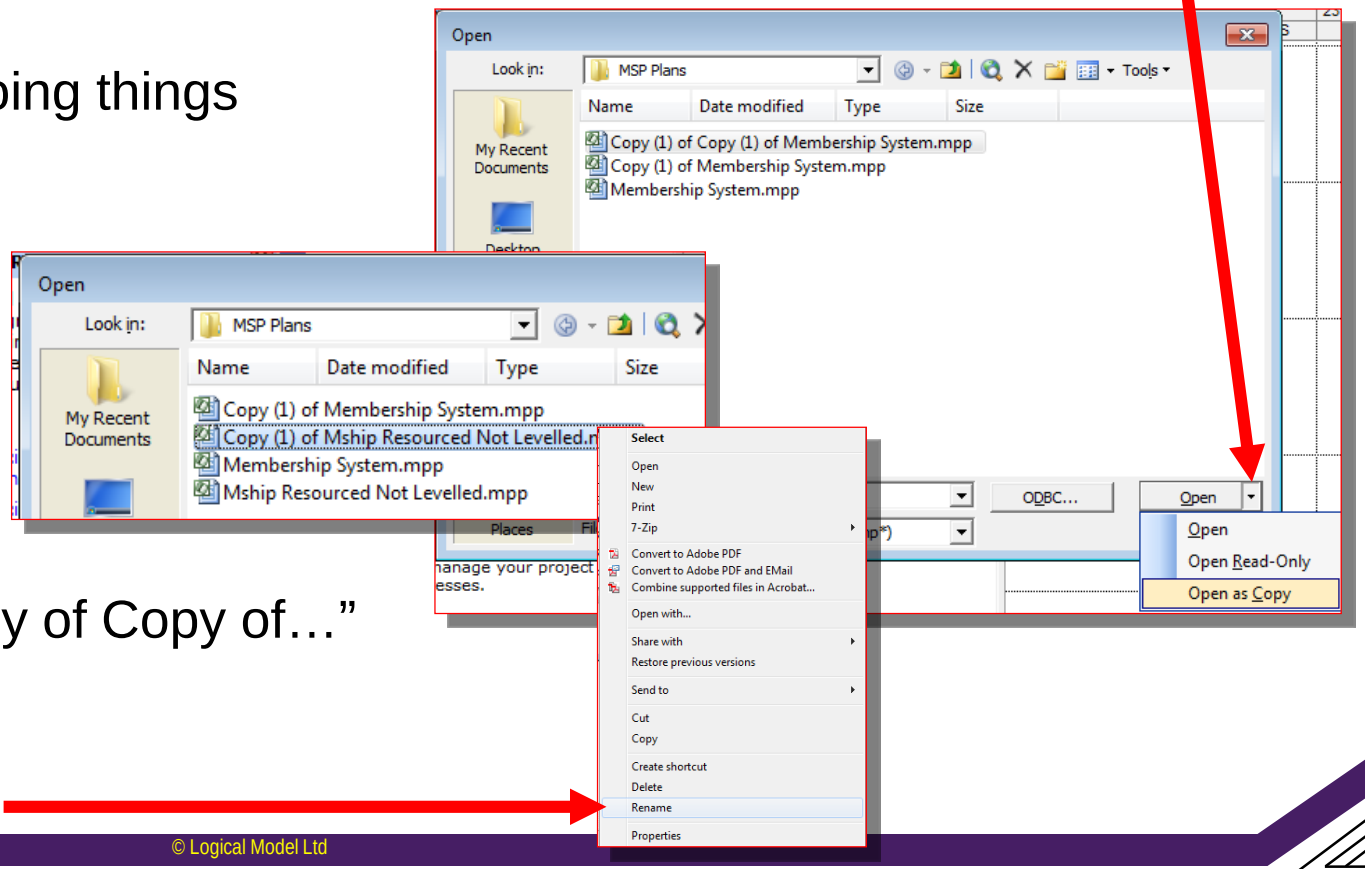
- Common that developing the plan happens in several sessions
  - When re-opening the file consider using "*Open as Copy*"
- MSPJ has ways of doing things that are irreversible
  - Less an issue after 2003
- Easy to rename "Copy of Copy of…" before next open
  - *Right-click | Rename*



Summary

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- The internal ‘sparse’ data hierarchy allows entry at any level
  - Reliably use of MSPJ needs adoption of some standardised ways of working
  - Task plus resources plus assignments versus timeline = costed schedule
- View data entered and calculated through views and tables
- These materials are provided for the use of individuals studying for their own professional development
  - If you encounter them in a context where a reasonable person might conclude someone is using them in a money-making setting: E.g. on a training course, provided on a company network or from your boss then please email details to MSPJ@LogicalModel.Net and I will treat your information as confidential AND share any fees I manage to levy
  - Further support for these materials is available and is explained in subsequent chapters and summarised at the end of the slides

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- Lesson 2

Lesson 2: Project Management Context For Software Tool Guidance

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Objectives

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- View and try-out the steps in the whole MSPJ journey in three slides
  - Create a base-lined project plan and track from beginning to end
- Summarise the whole planning process in a single picture to guide future steps
- There is a more extensive project management course available as a free eBook from www.logicalmodel.net
  - There are PMP, PRINCE2® and prince2 Agile courses and more

Project Management Guidance

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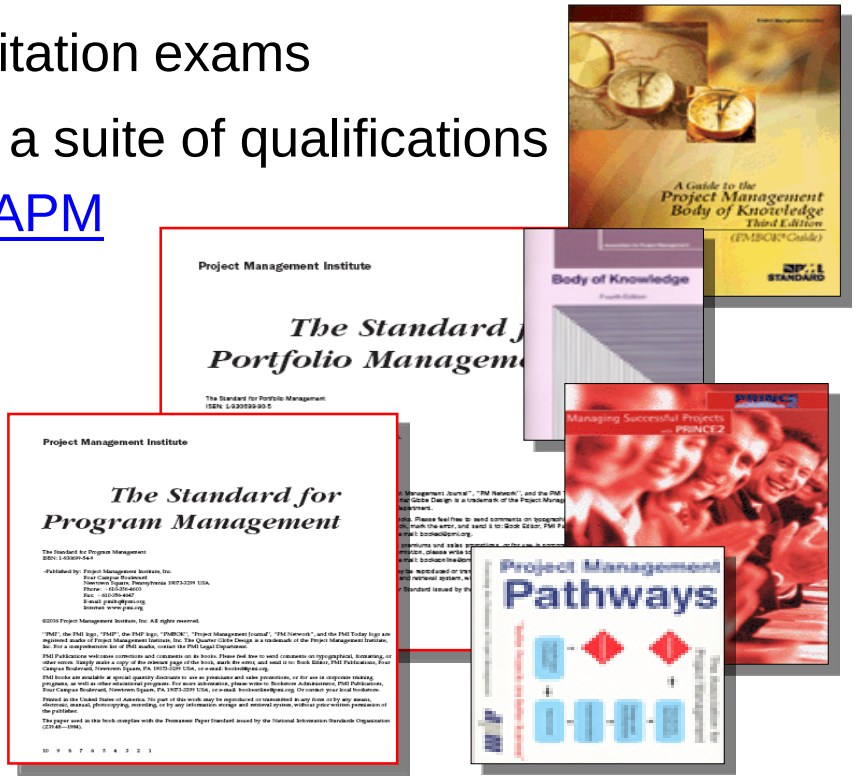
- PMI publish the PMBOK and run PMP accreditation exams
- APM publish the APMBOK & Pathways, have a suite of qualifications
  - Possibly the broadest advice. Part of the IAPM
- Others
  - PRINCE*, ISEB & other (EG NVQ)
  - Major consultancies/ corporate internal methods
- Set-out the topics (EG Scope), tools (EG WBS) and techniques (EG How to state risks) to manage project activity



- *Software (like MSPJ) facilitates documentation of planning outputs*
  - *(only) Mechanises the calculations and amendments*

* A project control regime that presumes you already know how to schedule and track. Good but being sold in exam contexts that mistake exam pass for real-world capability. Exam-cram courses are good for CVs when job-hunting but not doing the job in reality

Projects Must Link & Escalation

Mission, Delegation, in Decision Making

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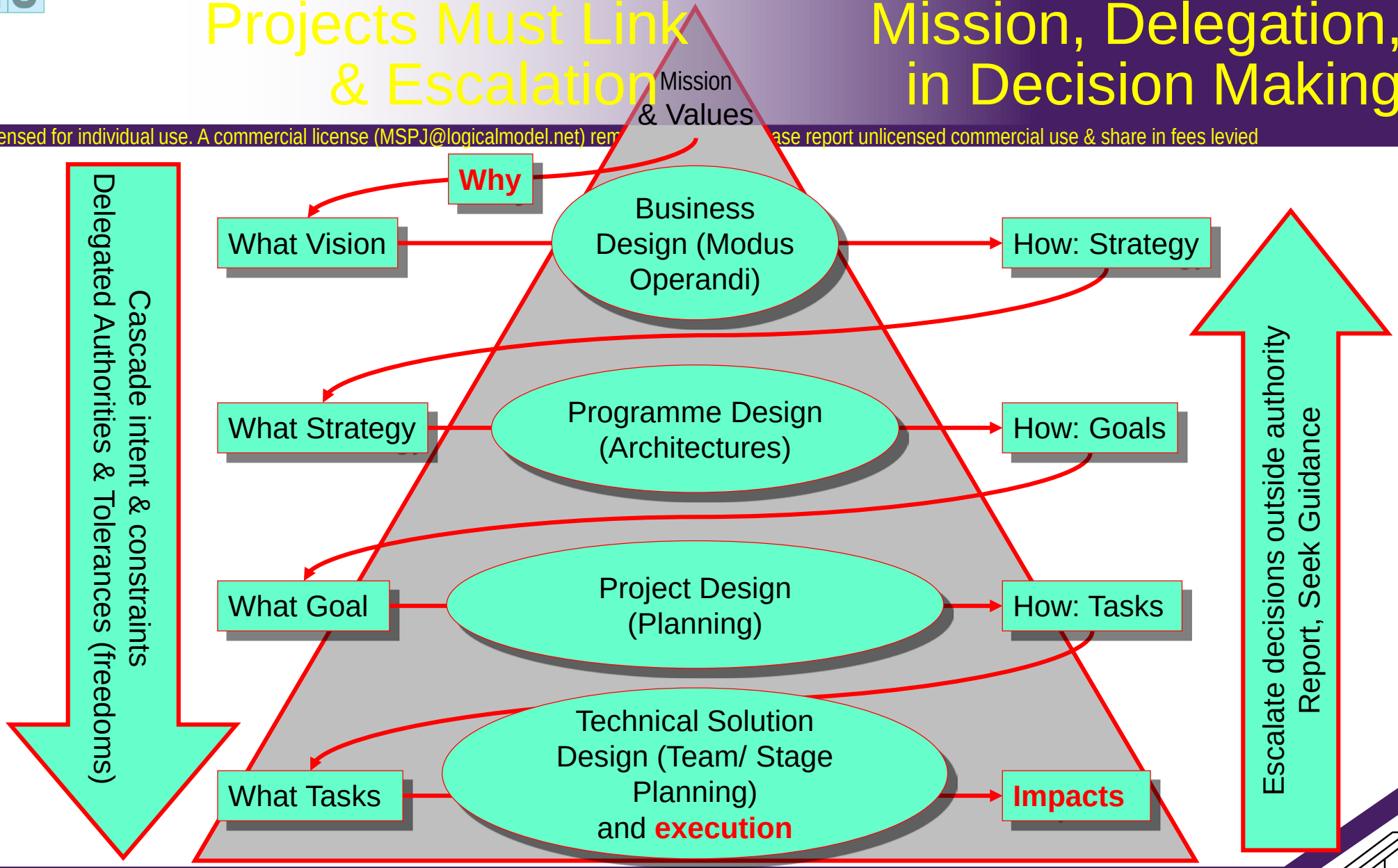

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The same icons are use in my free and paid courses where their humours intent is explained (see www.logicalmodel.net)

The Planning Process
Step 1: Define 'What', Constraints & Commercial Risk

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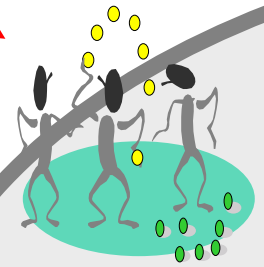
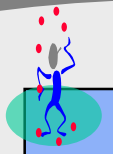


Step 1: Who's opinion matters?
Project Sponsor

Problem or Opportunity, Resources & Constraints



Appoint PjM

Project

Step 2: Define project Goal in outcome language e.g. Deliverables

Deliverables (Product/ Impact/ *Result*)

Step 3= *Decompose* Result into Sub-Products/ Impact/ Result

Step 3= *Product Breakdown Structure* (PBS) – Workshop with Customer/ Users

Step 3= Define each product's (results) Acceptance Criteria *Define FFP, Link to OMS*

Define Business/ Strategic/ Outcome Risks

When delivered as an instructor led course discussion includes identifying and resolving contradictory opinions, stakeholder analysis, affect of politics on the size of the change budget (time and money) and lots more

FFP = Product's Fitness for Purpose

Planning 'How' & Technical Risk

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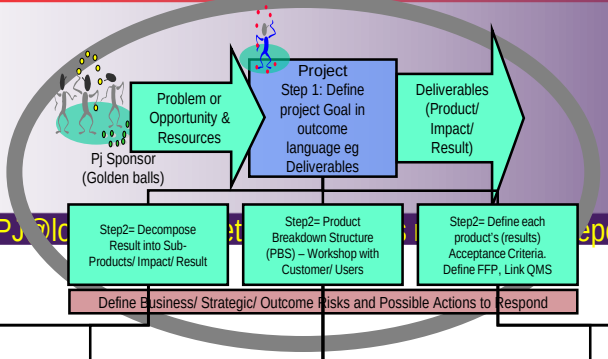

Step4: Step4: Step4: Step4: Step4: Step4:

Define Technical/ Tactical/ Process Risks and Add Risk response options to WBS

Step 4= Decompose each Sub-product to show its life-cycle

Step 4= *Work Breakdown Structure* (WBS) – Workshop with Technical Teams

With Technical Team

Step 4= Define each task's Performance Criteria vs. QMS.
Define C2S

Step 4= Define Pre- and Post event Risk response actions

Step99: Execute Task & Report Status

With Technical Team

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QMS = Quality Management System (Organisational Standards)
C2S = Process Conformance to Specification/ Quality Management System

The Planning Process Arriving At A Baseline

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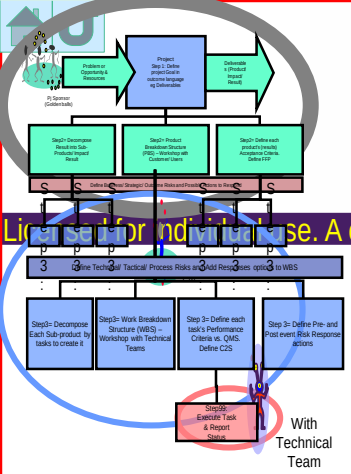

With Technical Team

Step 5=Define WBS task inter-dependencies

Step 5=Make initial Work Assignments from WBS to OBS

*Step 5=Estimate Work & divide by resource to determine duration**

Step 6 Merge into 1st idea of Critical Path & Critical Chain Analysis

Step 7 Redo Step 5 WBS vs. OBS, Estimates & dependencies until real world constraints met (or escalate constraint issues)

Step 8 (Re-)Consider balance of Risk, Cost, Resource, Reward and Re-plan, Cancel or Approve Business Case. Start execution

Step 99 Execute Tasks & Report Status

With Technical Team

On first pass estimate cheaply, quickly and crudely with single-point estimates
When critical path, bottle-neck resourcing, value and cost 80%/20% are known re-estimate the significant with care using techniques capable of expressing uncertainty and sensitivity

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OBS = Organisation Breakdown – Delegate/ Escalate

* Not the philosophy of MSPJ's creators: See also my Essentials of Estimating course

Development and Maintenance of Project Baseline

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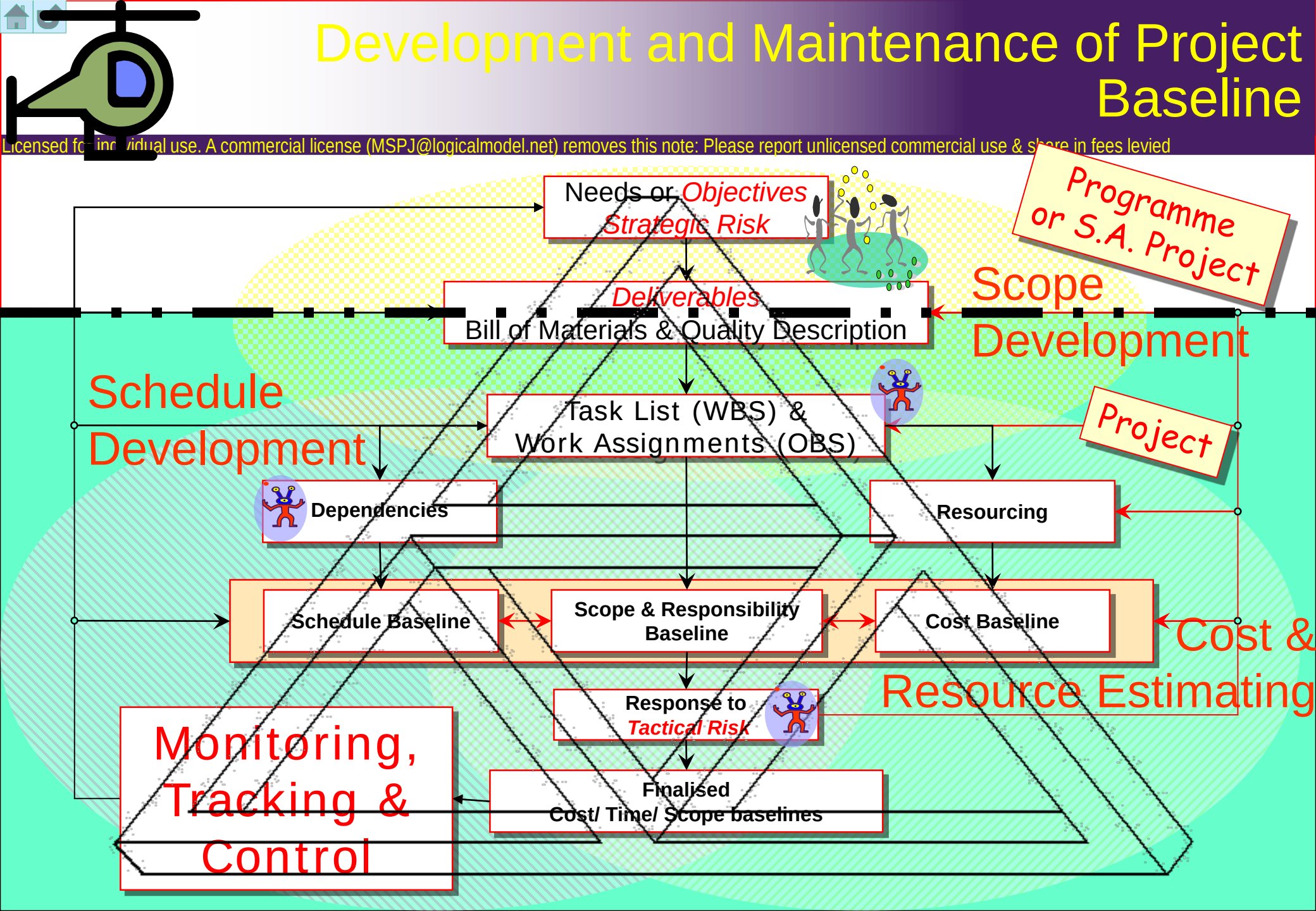

The Full Software Based Process

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- Equipped with knowledge of the life-cycle then the steps to define and track a project via MSPJ are:
  - Set-up the baseline
    - Add tasks
    - Set dependencies
    - Set work or duration
    - Add resources
    - Set assignments
    - Smooth and level schedule
    - Set baseline
  - Record progress made
    - Report
    - Amend baseline

Lets practice them all
Takes only the next 3 slides!

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The Full (Simple) Journey 1/3
Details Etc. Later

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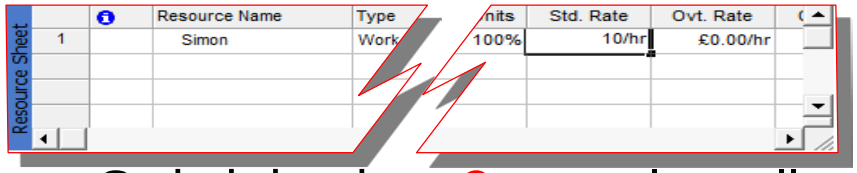
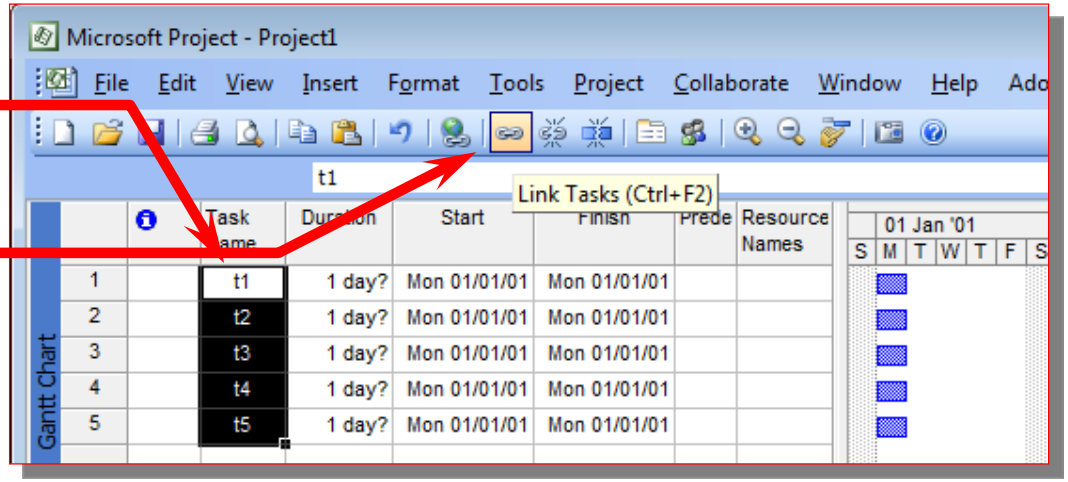
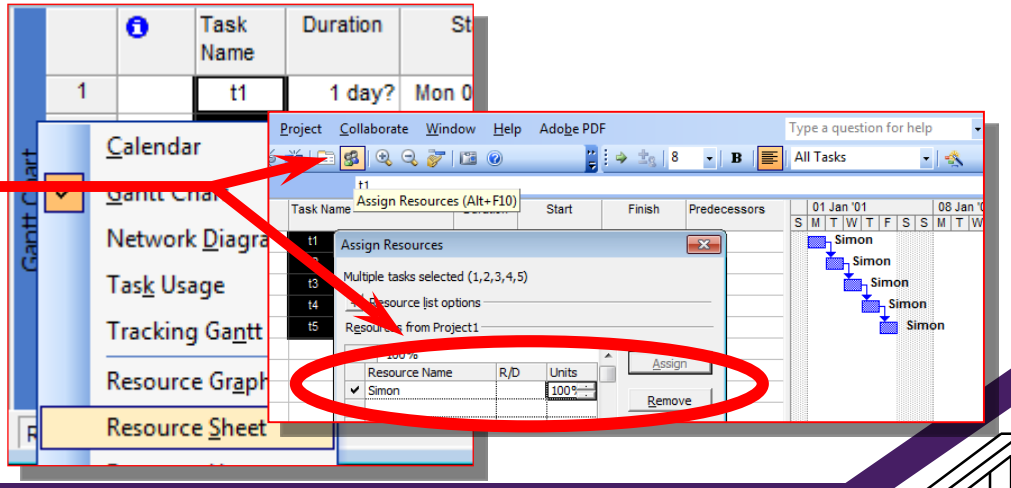
1. Open MSPJ
2. Enter some task names EG T1-T5 in the “Task Name” column
   - Select them all and link them
3. Switch to the *Resources Sheet* and enter a resource at a rate EG £10/hr



4. Switch back to *Gantt*, select all tasks and assign a resource 100%

- Save a baseline and view project statistics
- Set the status date to the project’s end date
  - Update project status to plan





The Full (Simple) Journey 2/3

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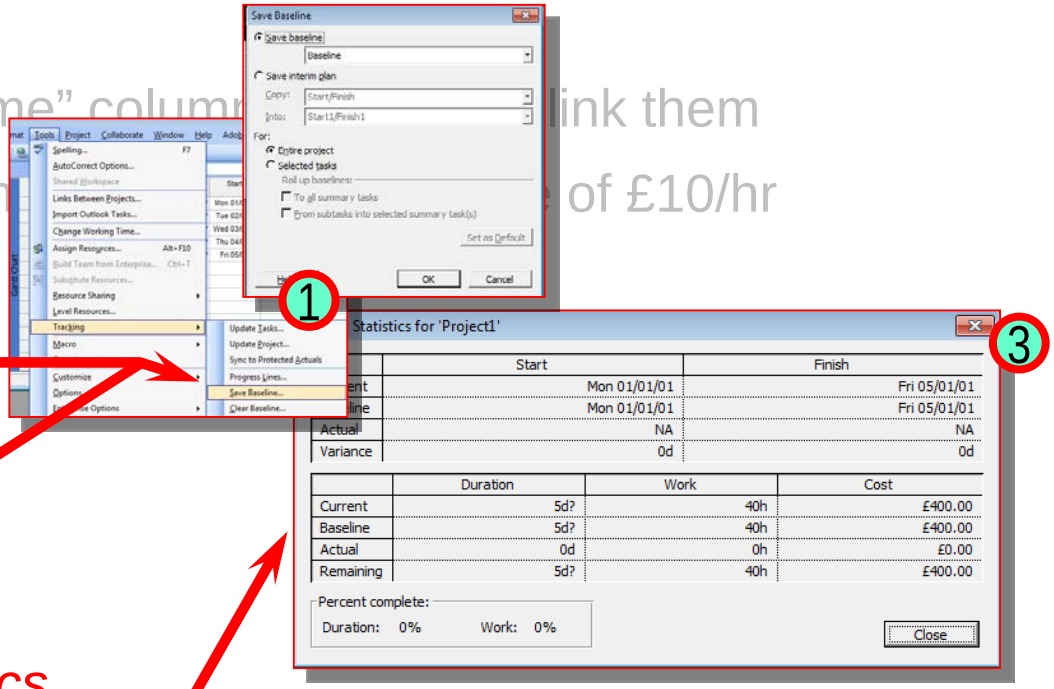
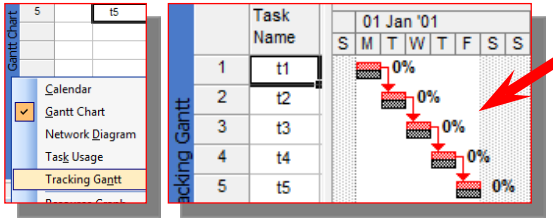
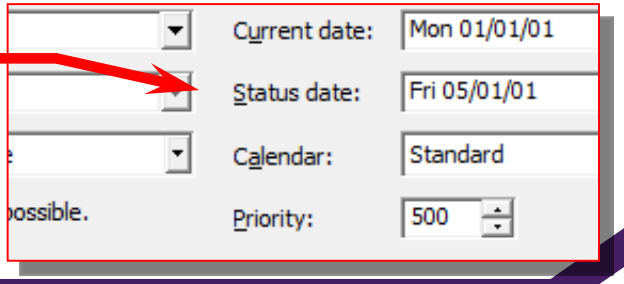
- Open MSPJ
- Enter 5 tasks T1-T5 in the “Task Name” column, link them
- Switch to the resources sheet and enter a rate of £10/hr
  - Assign the resource to all tasks

1. *Tools | Tracking | Save Baseline*
2. Switch to *Tracking Gantt* view
3. *Project | Project information | Statistics*
4. *Project | Project Information* & set the status date to the project’s end date

- Update project status to plan







The Full (Simple) Journey 3/3

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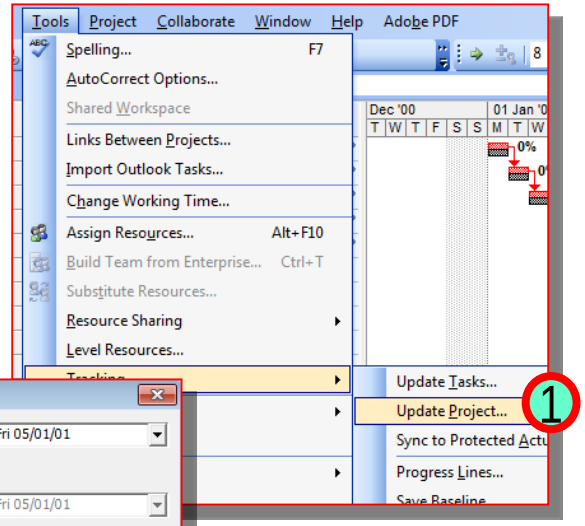
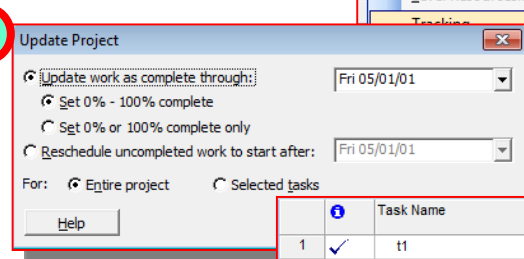
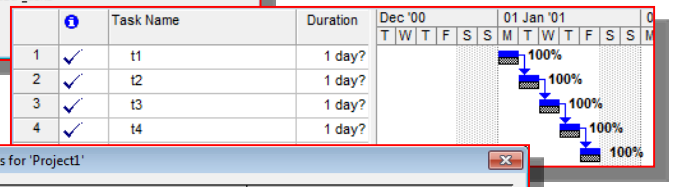
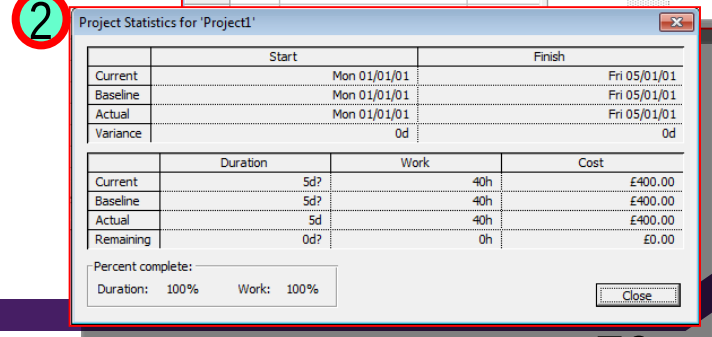
- Open MSPJ
- Enter 5 tasks T1-T5 in the “Task Name” column, select and link them
- Switch to the resources sheet and enter a resource at a rate of £10/hr
  - Assign the resource to all tasks
- Save a baseline and view | project information | statistics
  - Switch to Tracking Gantt view
- Set the status date to the project’s end date

1. Update project status to plan
2. Review the *Project | Project Inform’tn | Stats*
3. Assess Earned Value ! *(View | Table | More Tables…)*

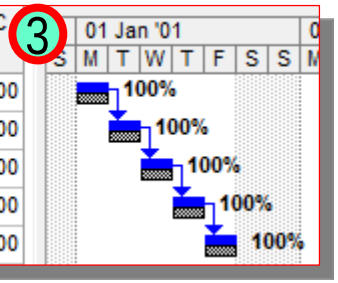








Task Name	BCWS	BCWP	ACWP	SV	CV	EAC	BAC	VAC
t1	£80.00	£80.00	£80.00	£0.00	£0.00	£80.00	£80.00	£0.00
t2	£80.00	£80.00	£80.00	£0.00	£0.00	£80.00	£80.00	£0.00
t3	£80.00	£80.00	£80.00	£0.00	£0.00	£80.00	£80.00	£0.00
t4	£80.00	£80.00	£80.00	£0.00	£0.00	£80.00	£80.00	£0.00
t5	£80.00	£80.00	£80.00	£0.00	£0.00	£80.00	£80.00	£0.00



Moving Beyond The Basis

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- The steps just covered are the whole project journey via software
  - Each operation just covered has options but in essence ‘we’ve done it all’
- Tracking status rarely reflects reality when using ‘Update Project’
  - Typical to have to ‘tune’ or adjust status and the plan
  - Use ‘Update Project’ to automated status recording that is to plan
    - Apply manual adjustments for what is ahead or behind or different to plan
- As we go part completed exercise files are referenced – you don’t need them: full instructions are in these slides but they are at www.logicalmodel.net for free
- Later chapters use a case-study
  - Everything you need to complete the case study is in this set of slides
  - A full set of case-study files is also on the website

Summary

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- Planning standards describe the process to build baselines
  - Bodies of knowledge describe the elements of baselines as well as (non-software) tools and techniques to create them
- Software planning tools hold data on tasks, resources, cost and calendars
  - Calculate and re-calculate schedules, cash-flows and resource profiles
- MSPJ workspace (screen) displays views comprised of tables and graphs
  - Tables and graphs interpret a hierarchical database
  - MSPJ shows current entered and calculated data
    - Optionally with saved snap-shots (aka baselines) of the evolving project's status
- MSPJ 'Help' provides reference info and procedural step-by-step guidance
- We have seen that the full, tracking cycle can be very simple and powerful!
  - The steps and structure remain the same for bigger projects
  - Lots of alternatives and options available

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- Lesson 3

Lesson 3: Setting Up The Project in MSPJ

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Objectives

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- Define the project through its key facts at summary level in MSPJ
  - (optionally) Set project start date (or finish date)
  - (optionally) Link to project charter (Control Account, Assignment letter etc)
  - Set-up project calendar and template calendars for resources and tasks
- Add the project's tasks (work-packages and planning packages)
  - Define project scope using PBS & WBS decompositions and enter to MSPJ
  - Documenting scope by creating WBS Dictionary entries
  - Use Outlining and Summary Tasks
- Know the prosaic! How to move, add, delete tasks
  - Create repetitive tasks
- Know how to capture PBS/ WBS dictionary (aka SOO & SOW) in *Task Information*
- Define and use outline levels and WBS codes
- Practice what we have covered

Development and Maintenance of Project Baseline

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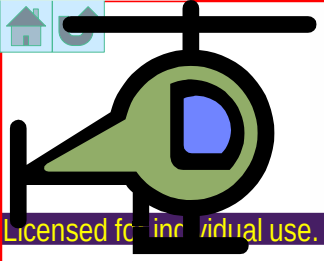

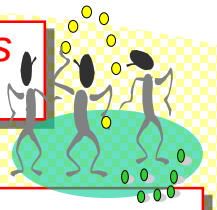

Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

Monitoring, Tracking & Control

When An Assignment Starts

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- Start of an MSPJ database (a plan in MSPJ) might be triggered by receipt of a sales call, RFP* or a chat with (or email from) the boss
  - Wider people focused project activity is:
    - 'Define stakeholders and the Goal' plus matched deliverables
    - Deliverables expressed in acceptance criteria terms
    - Interviews with the project's driving force, workshops with other change-agents
  - MSPJ's main use begins as:
    - Deliverables and their Acceptance Criteria (AC) are defined
    - Tasks to create the deliverables are identified
    - Resources to execute the tasks are defined
- Software activities are to create the database/ project file
  - Set-up calendars
  - Link project documentation such as charter to the project

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*RFP = Request For Proposal

Complete Journey: Starting At The Beginning

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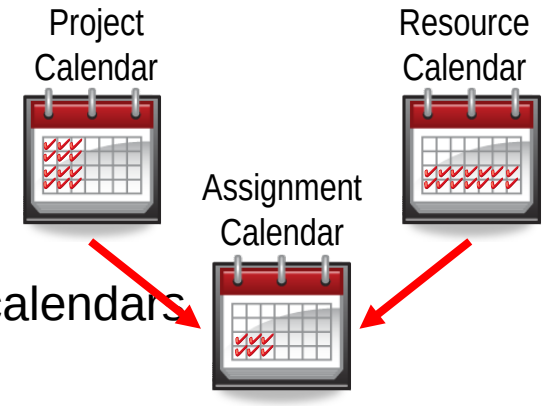
- Budgets and cash-flow depend on scheduled work
  - *Work* (effort) depends on scope expressed in terms of “what” and “how good”
  - Schedule depends on resources and calendars

- When adding tasks we must establish calendars
  - May only need to be done once for the enterprise
  - Three sets of calendars determine assignment dates
    - 1-Project working time, 2-Resource calendars, 3-Task calendars
    - (Task calendar may override all other calendars)



- Before or after setting calendars we might ‘Define the project’
  - For MSPJ this is mostly linking to other documentation such as charter/ contract/ task assignment/ Quality Management System
  - Plus set project start date and any default settings (E.g. Hrs / Working day)

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The Project Info Window

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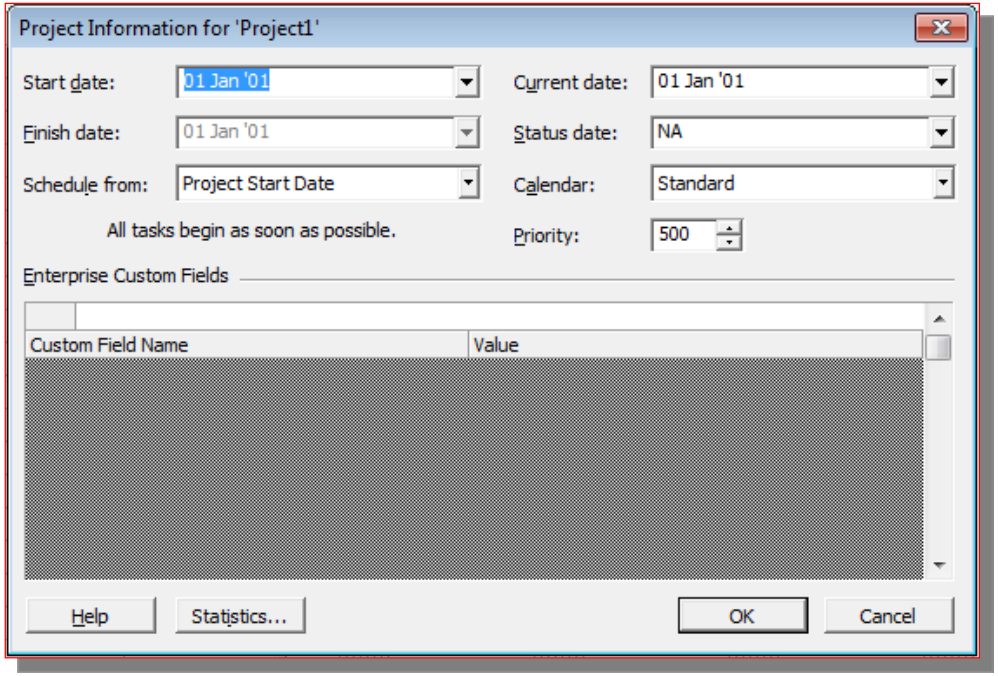
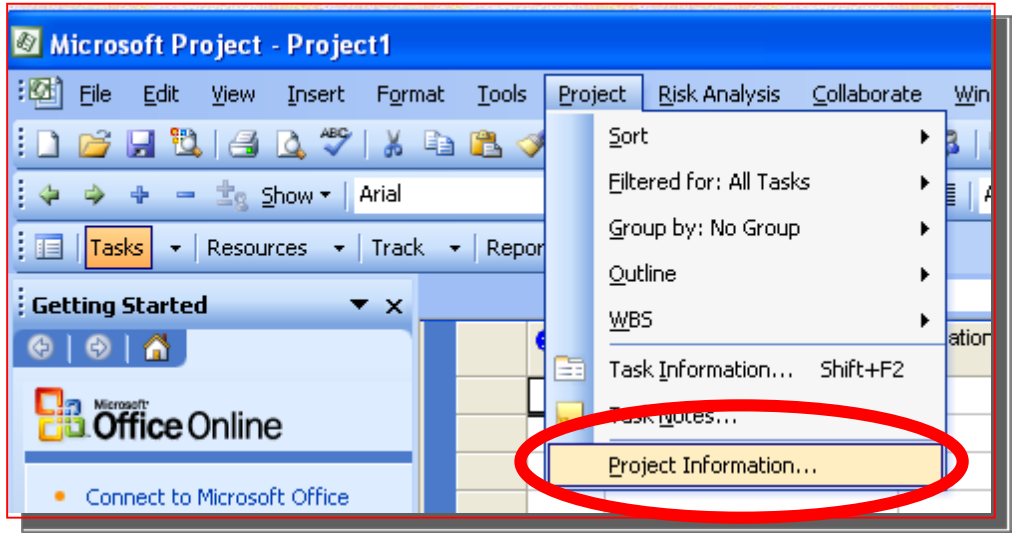
- Setting up a project in MSPJ starts with *Project | Project Information*
  - Set Project Start (or Finish) date
  - Perhaps today's date too
    - 'Today' is really a 'data as at'





- Before or after the Project Kick-Off meeting

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Setting The Calendar

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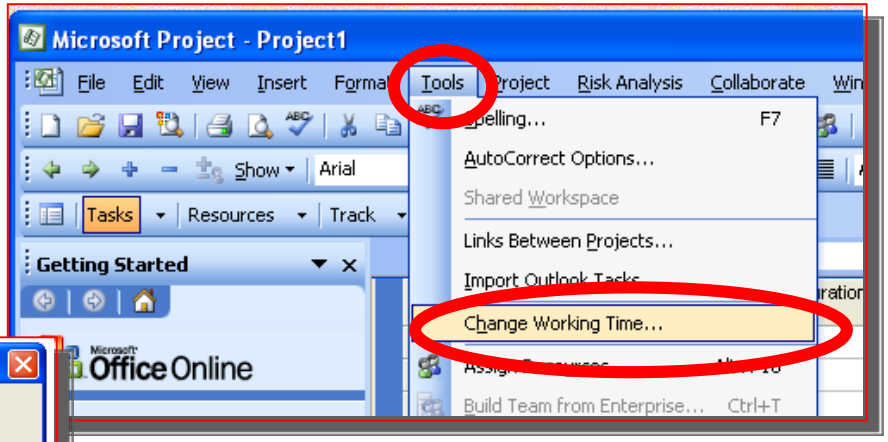
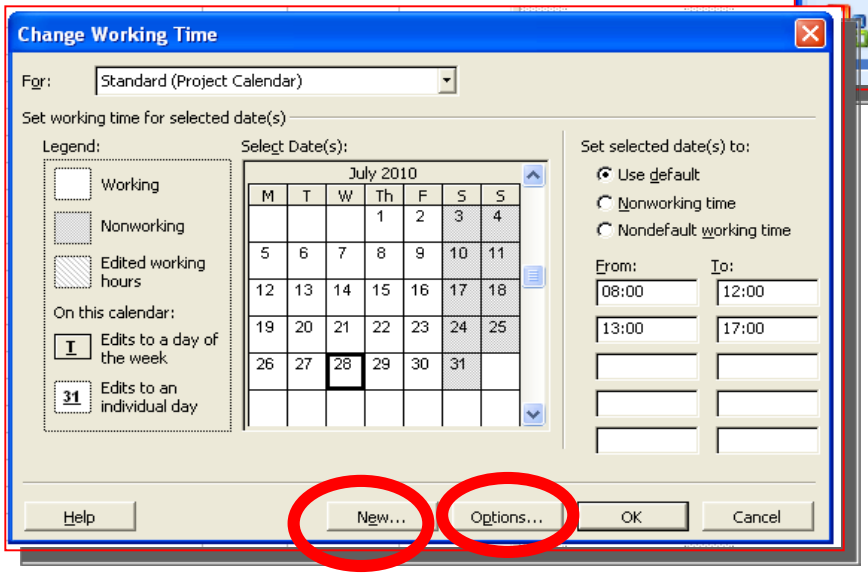
- The scheduling engine always needs to know which hours of which days are 'working hours'
  - "Resource calendars" and "Task calendars" based on templates created with "New…"
- *Tools | Change Working Time*





- Matching "Working Times" to the default definition of a "day's work" is crucial
  - Set by *Options* aka *Tools | Options | Calendar* (next slide)

Change Working Times

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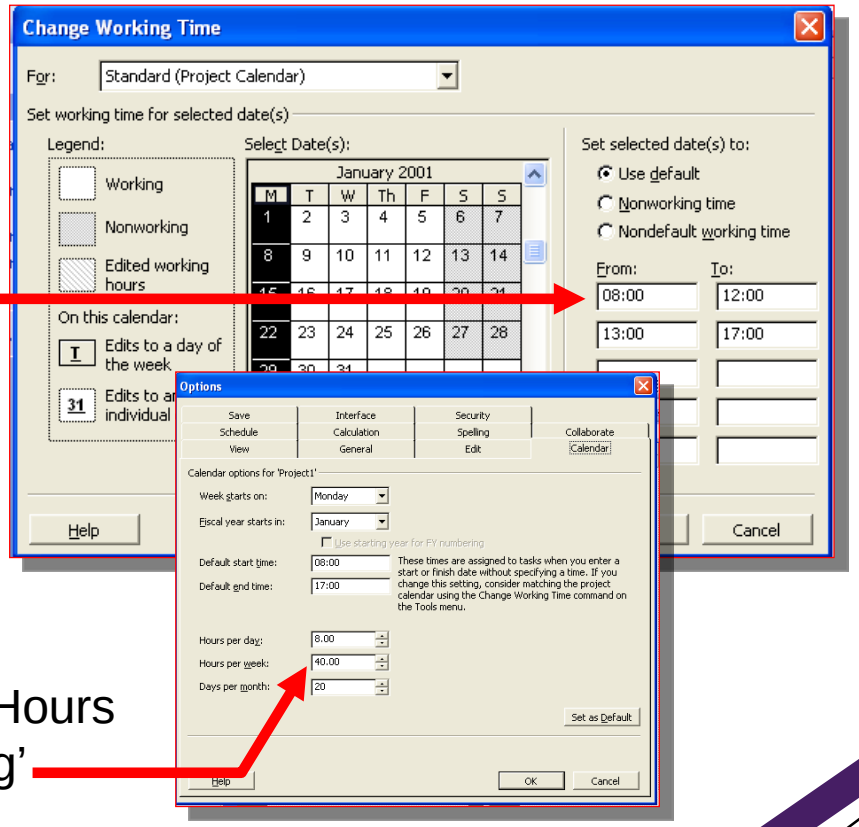
- To set the working days and shifts
  - Select a single day & mark options: non-working or non-default & set times
  - Select a DAY HEADING to change every occurrence
- Calendars for project, tasks and resource assignments define basis for scheduling
  - What is recorded in the database when adding *duration* or *work* to a task is defined by *Tools | Options | Calendar-tab*
  - More later: for now note it is always best to keep the two in- line
    - If a calendar day is 8-5 with lunch then 'Hours per day' other than 8.0 will be 'interesting'



Creating New Base-Calendars

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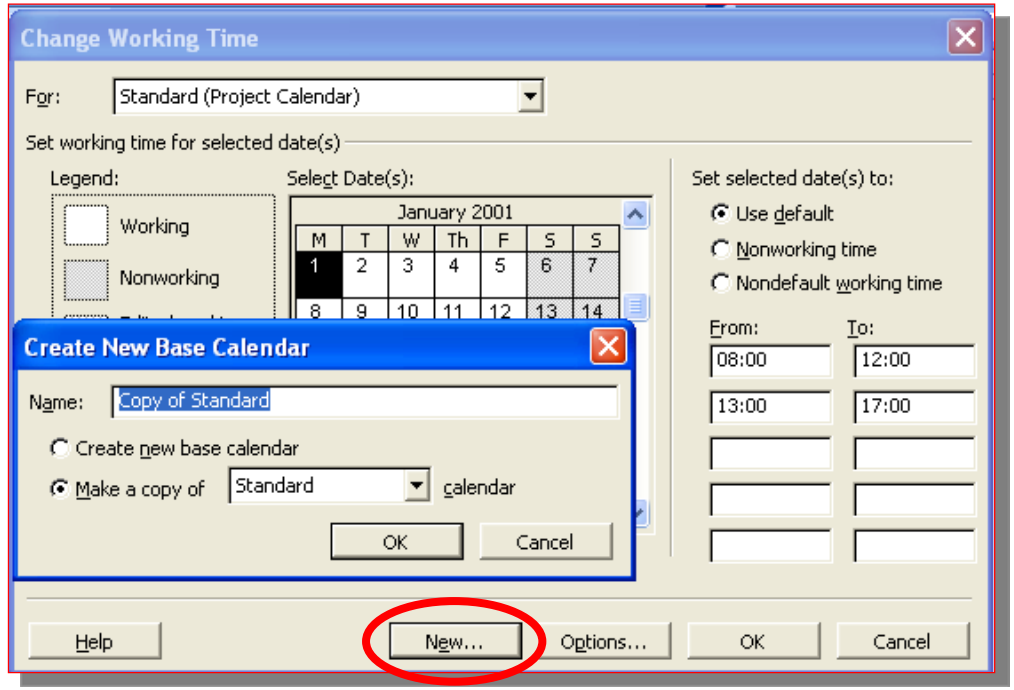
- Task Calendars need a Base-Calendar to be based upon
  To create a new calendar
  - Select *Create new…*

- New calendars can be created at any time without consequences



- Changing the project's working times part-way through is 'interesting' but 'OK'
  - EG it is almost easy to swap a project from European to Middle-Eastern calendar

Linking Documentation 1/2

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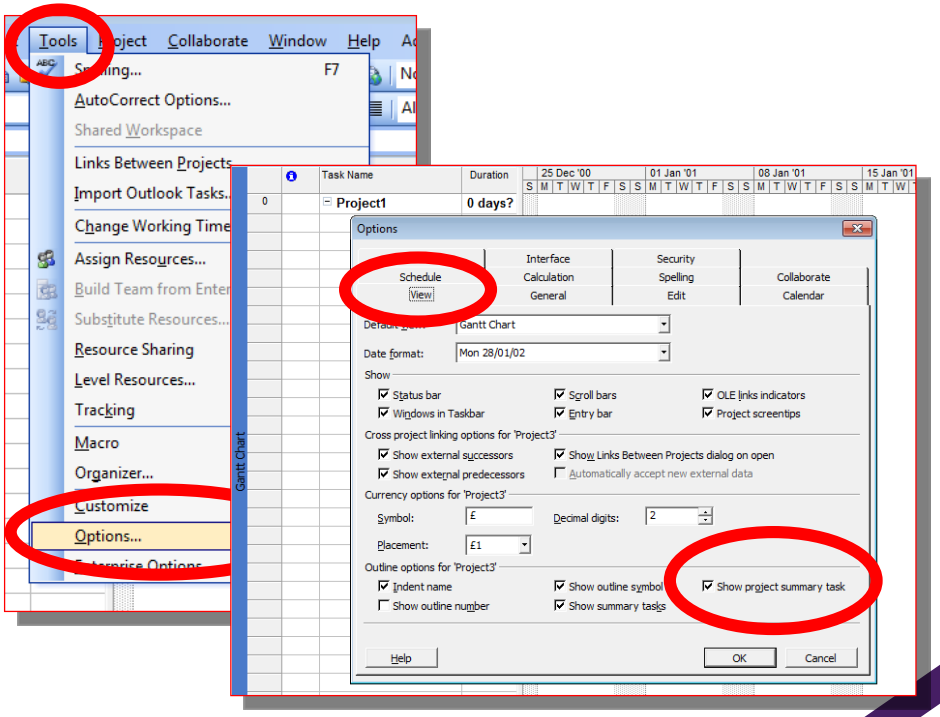
- Add the Project Charter, Statement Of Work or assignment details to the Project Summary
  - Optional, but a good ‘standard practice’

- First: Show the project summary task
  - *Tools | Options | View-tab | Outline Options | Show Project Summary Task*
  - Linking procedure given here applies to tasks, resources and assignments as well as project summary task
    - EG Linking quality standards and QMS entries to a WBS task or a deliverable defined in the PBS uses the same steps



Linking Documentation 2/2

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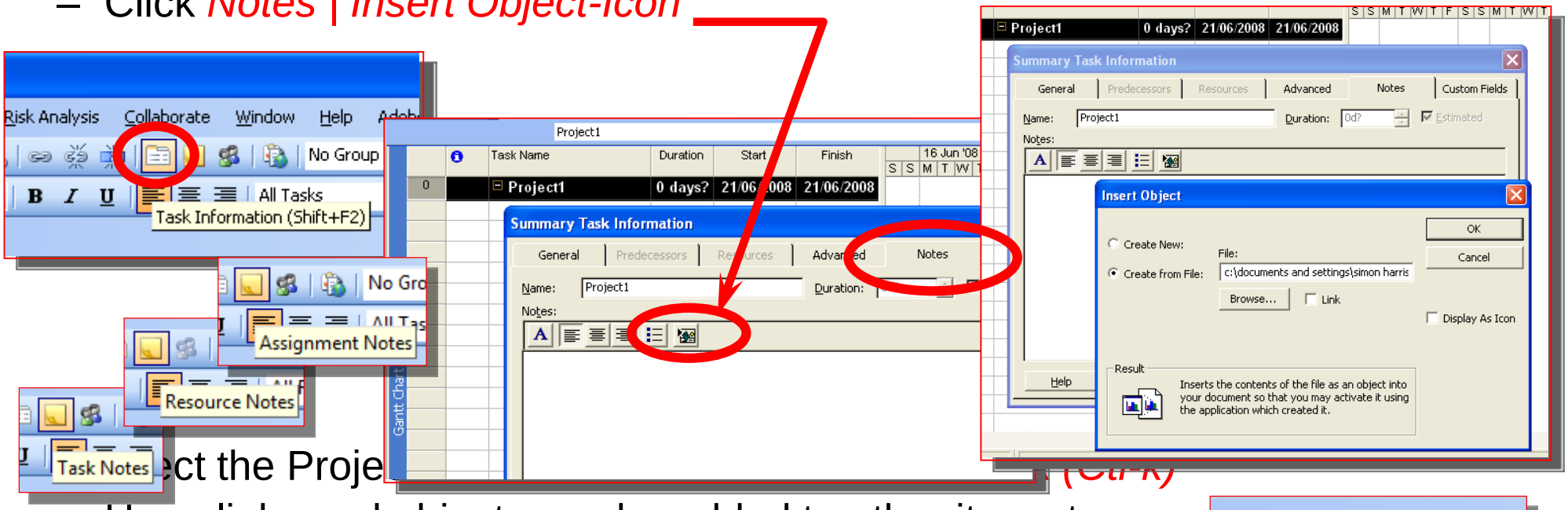
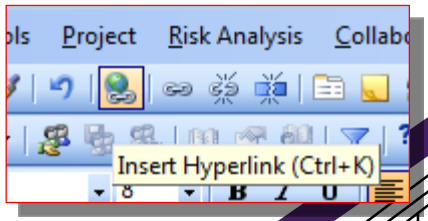
- Select the summary task
  - Click "*Task Information*" on the menu (or Right-Click or Double-click the task)
  - Click *Notes | Insert Object-Icon*



- ct the Proje (Ctrl-K)
  - Hyperlinks and objects can be added to other items too
  - Depends on the 'view context'



Development and Maintenance of Project Baseline

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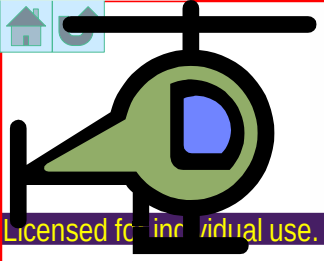
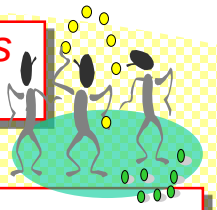




Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

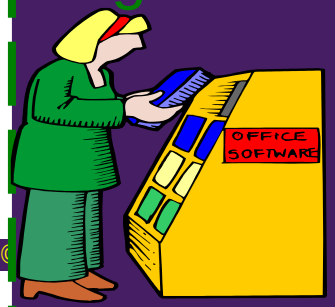
Monitoring, Tracking & Control

Business Context

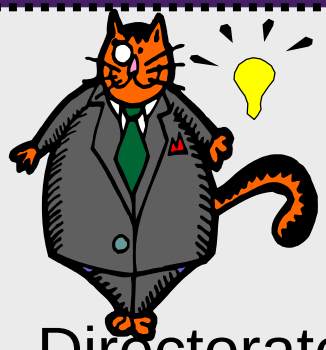
Shareholder

Competition

Regulators



Customer



Directorate

Benefits Stream

Company Context

Functional Mgmt

Pgm Team

Need

Constraints

Business
Change

Operations

PjM

PjM

PjM

Internal
Deliverables

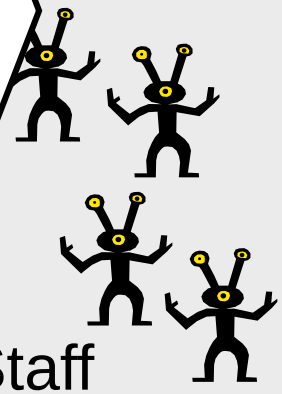
Project Plan,
Reporting & Status

Project to project

Deliverables

The Team

Projects



Staff

Modelling Scope: Required Results

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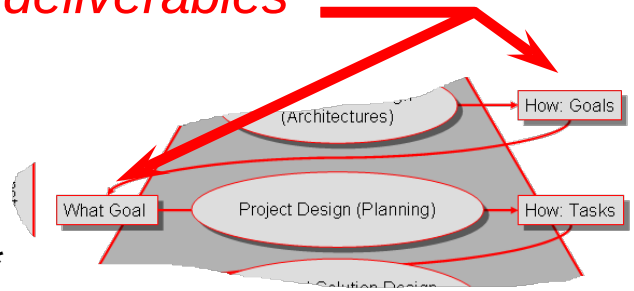
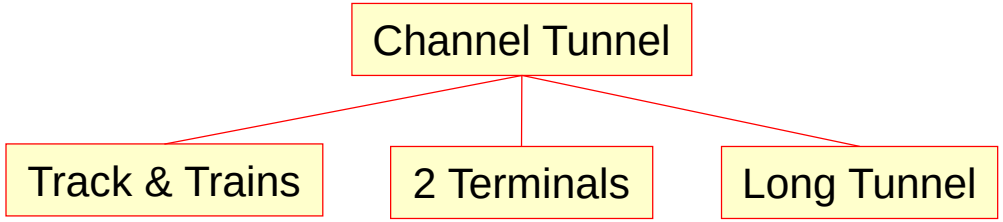
- *Start with the customer* and identify and *decompose deliverables*
  - Brainstorm major deliverables that together totally resolve the need
    - Record each deliverable's acceptance criteria in its Breakdown Structure dictionary entry*





  - Decompose each deliverable until customer no longer wishes to specify details or item not usefully decomposable** for those present
    - Later steps decompose the product's life-cycle (and record tasks in the WBS)

Result of scoping meetings and workshops is the information to document in MSPJ

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* and ** Note: These steps are links to Configuration Management and Quality Management

Breakdown Structures
WBS or PBS or OBS or GBS or CBS...

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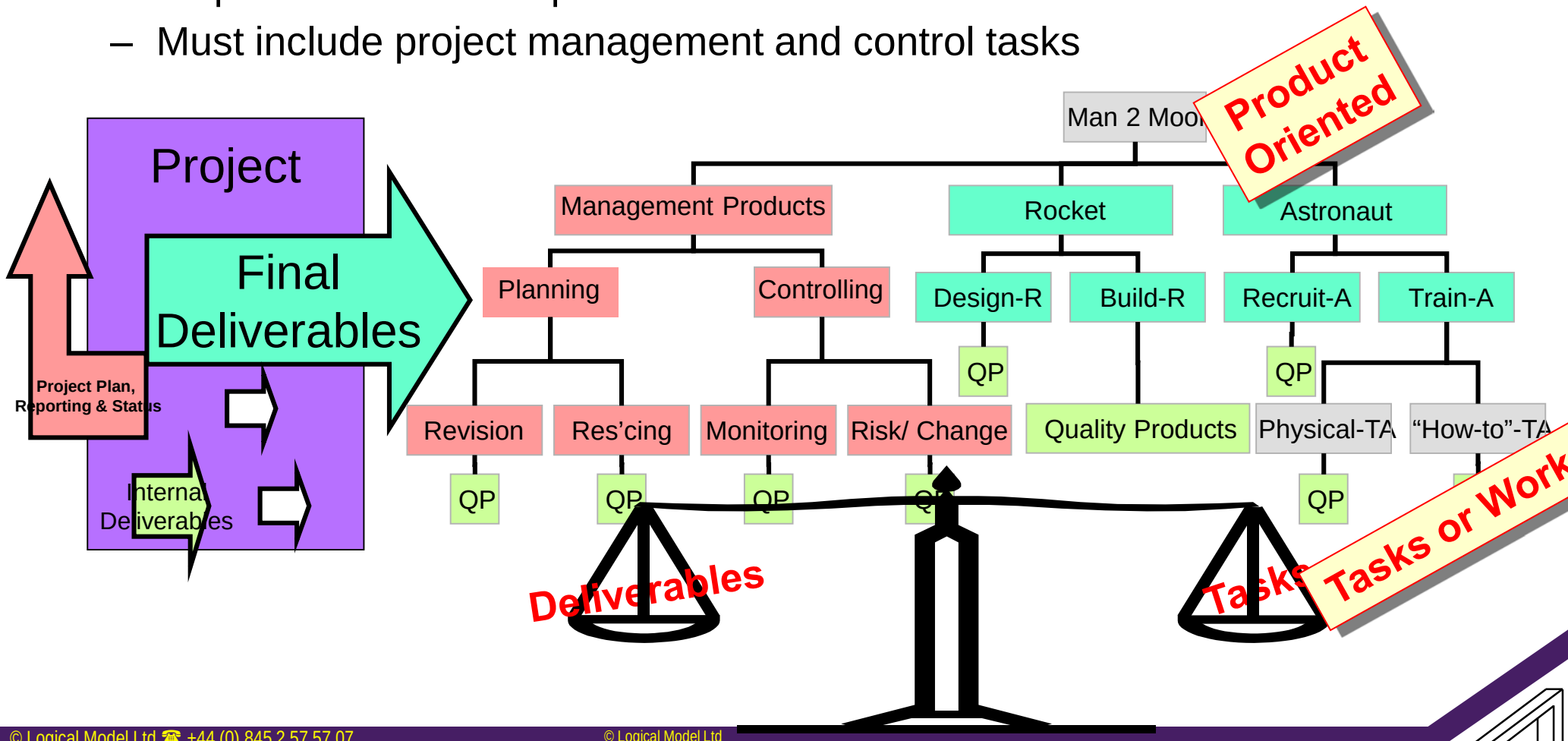
- xBS equals *ALL* the x* to produce *ALL* the *deliverables*
  - Must include project management and control tasks



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* x can be PBS=Products, WBS=Work, PBS=Phases, OBS=Organisational units, SBS = Services, G/LBS=Geographic/Location, RBS=Risk, CBS=Cost centres or other "grouping", REBS & ROBS = Risk Event & Outcome

Documenting Required Results

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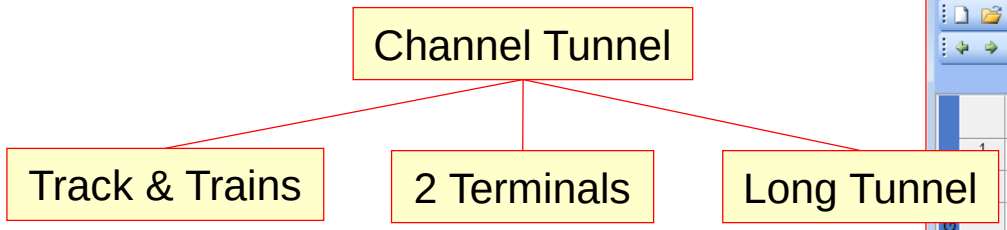
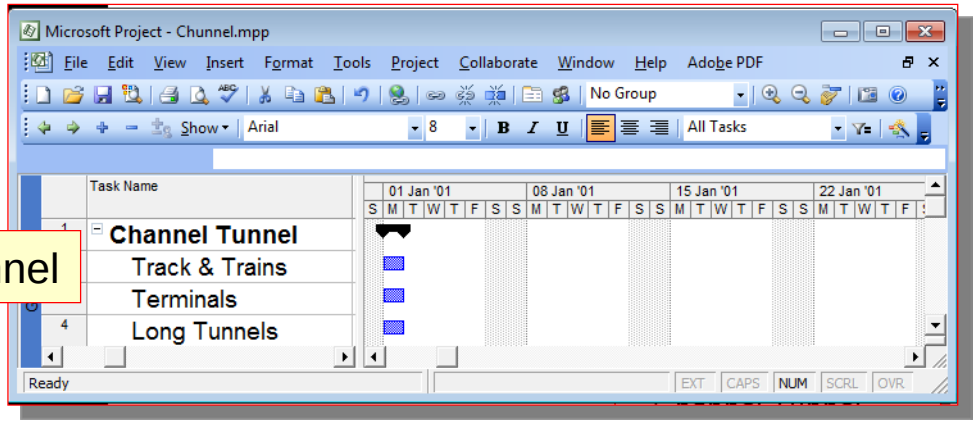
- Enter the deliverables discovered in scoping sessions into MSPJ's task list
  - Decompose *deliverables* into *sub-products* (MSPJ 2010 features help here)
  - Until no further product decomposition is useful (at this management's level)
    - *Then* decompose into *life-cycle steps*/ stages/ phases





- Use *Task Information | Notes* to record PBS/ WBS dictionary entries (SOO & SOW*)
  - Link to Quality Management System standards for products and processes (More later)

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* Contract appendices to define the outcome being paid for or the tasks being paid for. SOO is performance based will SOW is compliance based – see the vast writings of the US DOD Federal Acquisition Regulations for more on this aspect

As Scope Evolves The Breakdown Expands

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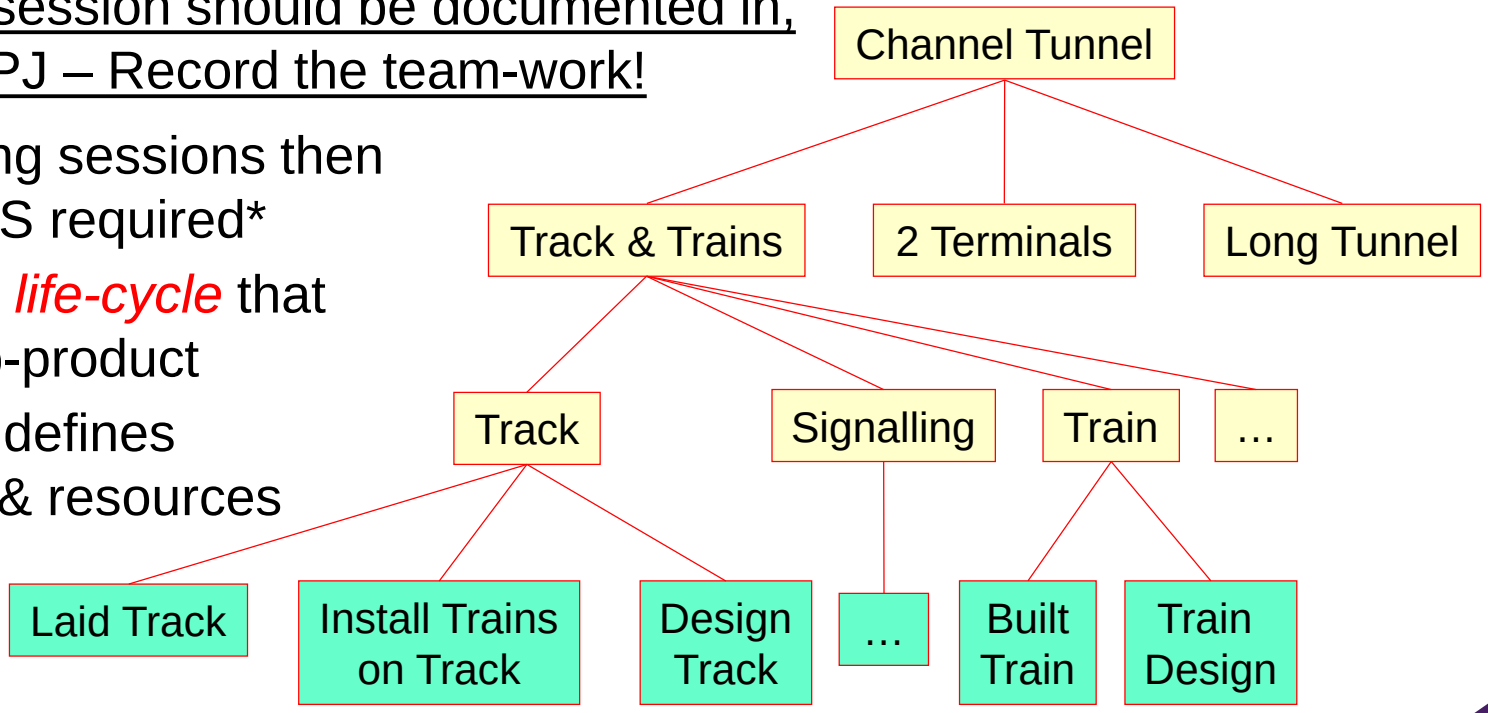
- Use the technical team's expertise to *decompose* each (sub-)product into lower-level products (as the technicians identify is needed to resolve choices)
- Results of scoping session should be documented in, (transferred to) MSPJ – Record the team-work!
- After product scoping sessions then consider the TASKS required*
  - The *tasks in the life-cycle* that create each sub-product
  - The deliverable defines the tasks, skills & resources required to gain acceptance



- As many levels as needed at 'this' management level to exercise control

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*See my white paper in the American Society for the Advancement of Project Management's Newsletter Jan & Feb 2010

As Detail is Discovered Then Add Tasks To MSPJ's Breakdown

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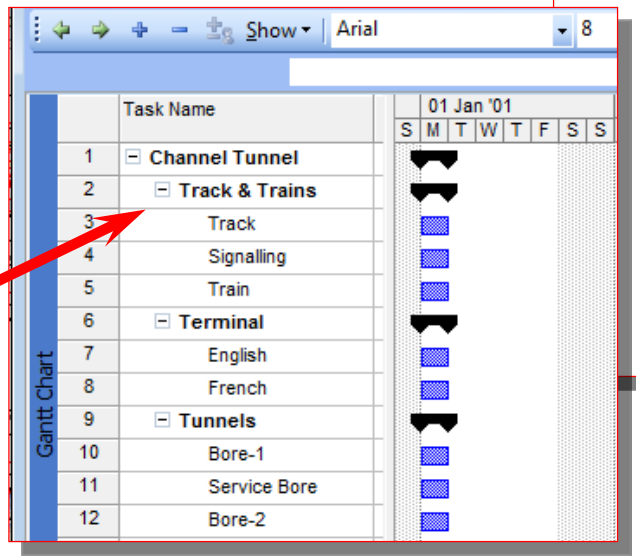
- Many ways to add the tasks
  - Direct entry: just type the *task name* into the "Tasks" column
  - Copy and paste from a text list (Eg created in Notepad)
  - Import other formats EG Excel template or MS-Access
- Always best to use descriptive names for tasks
  - DON'T add dates or durations (at this stage) unless constraints
- We also need to know how to:
  - Move and delete tasks
  - Add structuring
  - Add dependency links
  - Re-Sequence



- Channel Tunnel
  - Track & Trains
    - Track
    - Signalling
    - Train
  - Terminal
    - English
    - French
  - Tunnels
    - Bore-1
    - Service Bore
    - Bore-2

Scoping Workshops

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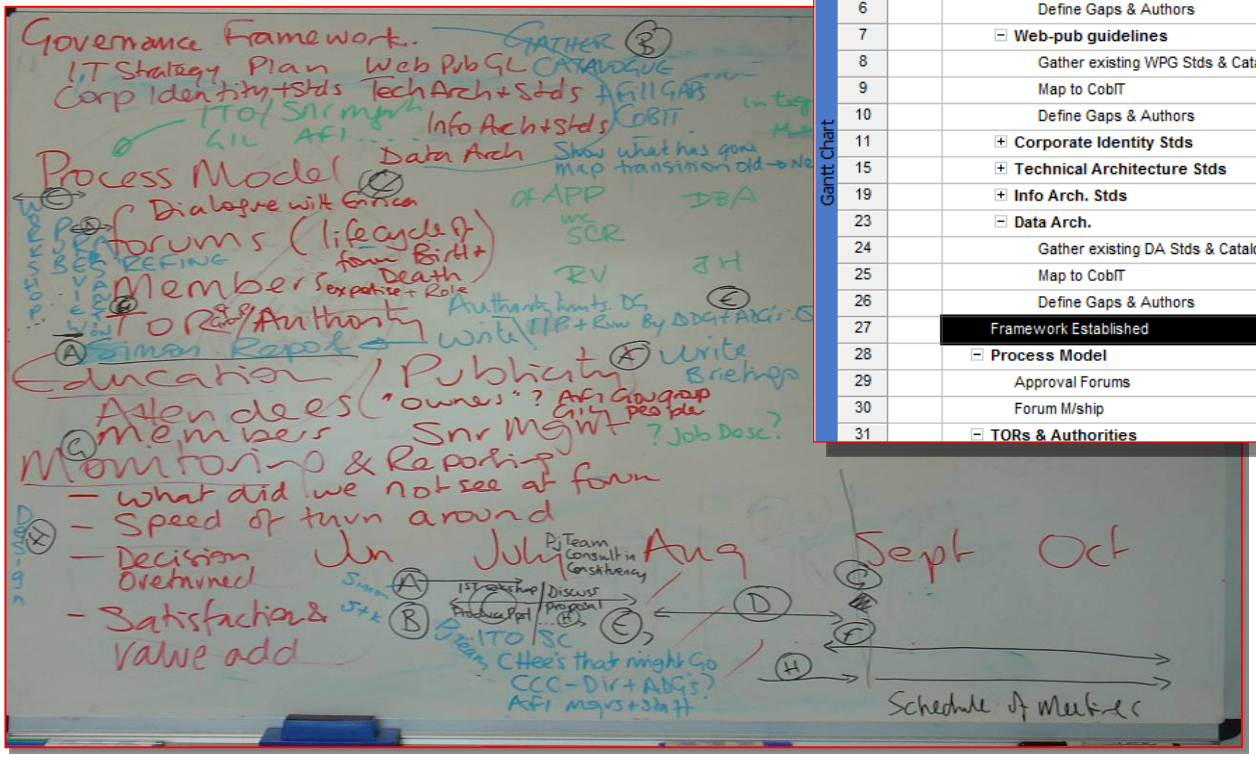
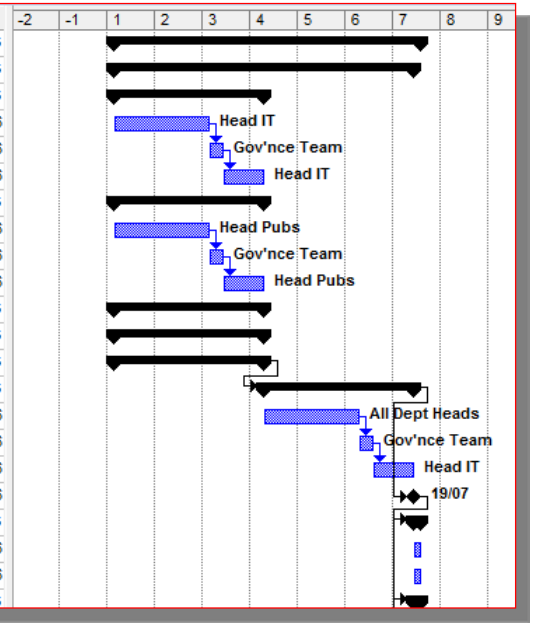
- ‘Real planning’ creates outputs such as the white-board pictured
  - Results are then entered into the software tool



	Task Name	Duration	Start
1	IT Governance Roll-Out	33 days?	06 Jun '06
2	Governance framework	32 days	06 Jun '06
3	IT Strategy plan	16 days	06 Jun '06
4	Gather existing WPG & Catalogue	10 days	06 Jun '06
5	Map to CobIT	2 days	20 Jun '06
6	Define Gaps & Authors	4 days	22 Jun '06
7	Web-pub guidelines	16 days	06 Jun '06
8	Gather existing WPG Stds & Catalc	10 days	06 Jun '06
9	Map to CobIT	2 days	20 Jun '06
10	Define Gaps & Authors	4 days	22 Jun '06
11	Corporate Identity Stds	16 days	06 Jun '06
15	Technical Architecture Stds	16 days	06 Jun '06
19	Info Arch. Stds	16 days	06 Jun '06
23	Data Arch.	16 days	28 Jun '06
24	Gather existing DA Stds & Catalog	10 days	28 Jun '06
25	Map to CobIT	2 days	12 Jul '06
26	Define Gaps & Authors	4 days	14 Jul '06
27	Framework Established	0 days	19 Jul '06
28	Process Model	1 day?	20 Jul '06
29	Approval Forums	1 day?	20 Jul '06
30	Forum M/ship	1 day?	20 Jul '06
31	TORs & Authorities	1 day?	20 Jul '06

Gantt Chart



Planning can NEVER be done as a solitary activity BECAUSE:
SOOP: A plan is a shared consciousness that : for a given result predicts what resources will be consumed by what activities and when to deliver the required impact

SOOPs are “Simon’s Observations on Projects” Partly born from the observation that “using a project management method is like making soup”. A paper to this effect is on the web-site www.logicalmodel.net

Selecting Work-Space Elements

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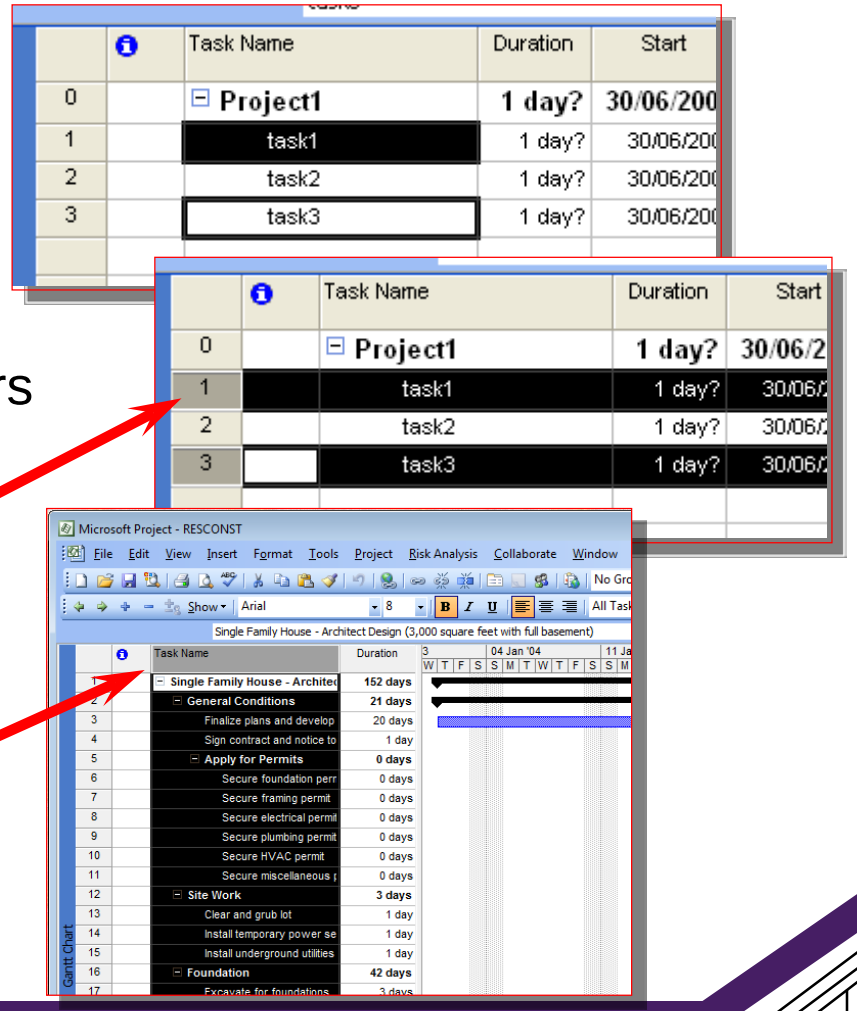
- Click selects
  - *Click and drag* selects multiple items
  - *Control-click* selects non-adjacent items
    - Must be same field type or same task
    - *Ctl-Click-Drag* selects non-adjacent groups
  - *Click* either *cells* or row and column headers
- *Click* a *row-header* to select the task
  - Click fields to select their contents
- *Click* a column header selects all tasks



Moving Tasks & Inserting Tasks

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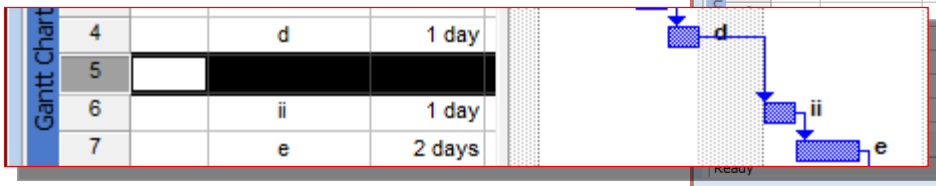
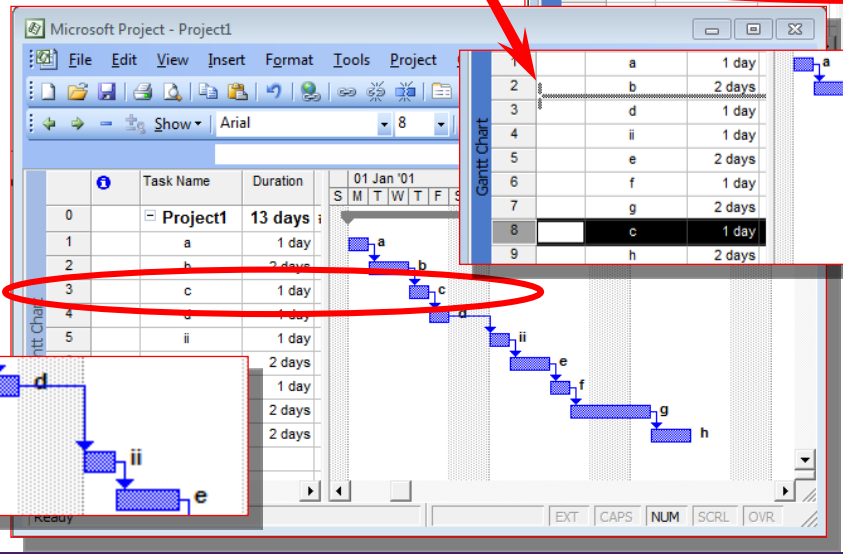
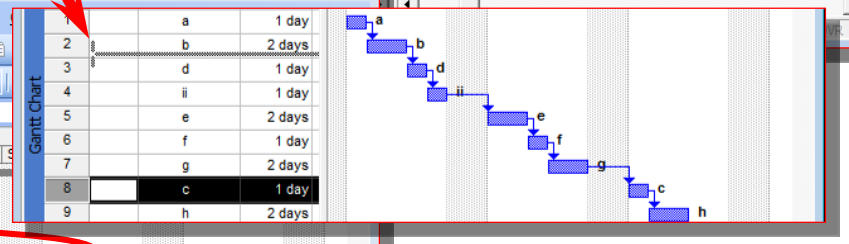
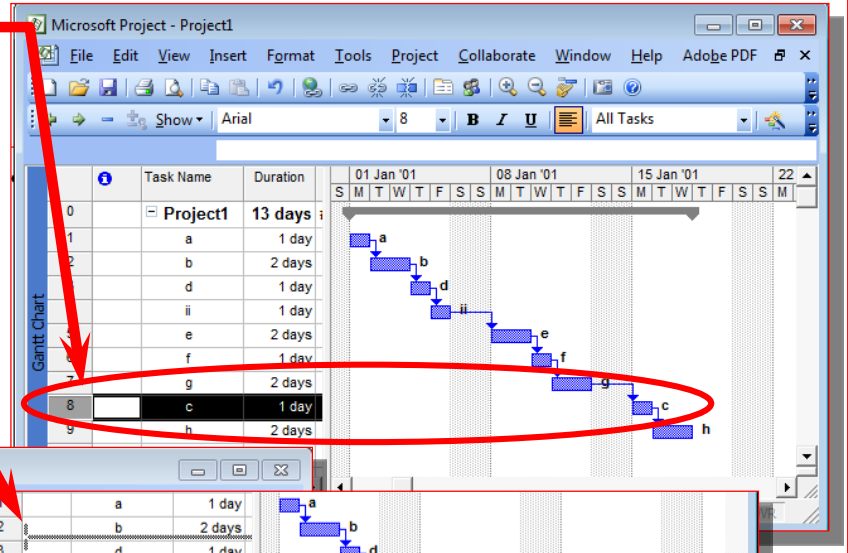
- To move a *task(s)* select its grey row header
  - Drag the row to its destination
  - Dragging retains task-id
    - Cut & paste changes task-id
    - (If Auto-link is on then linked tasks are re-linked*)
- *Insert | New Task*
  - Or '*insert*'-key
  - Adds the new row ABOVE the current row









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*Auto linking works for simple, singularly linked tasks. It sometimes works on tasks with more complex or multiple dependencies but generally a task with more than one predecessor and successor needs manual care

Deleting

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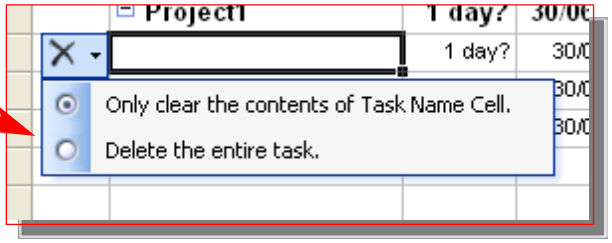
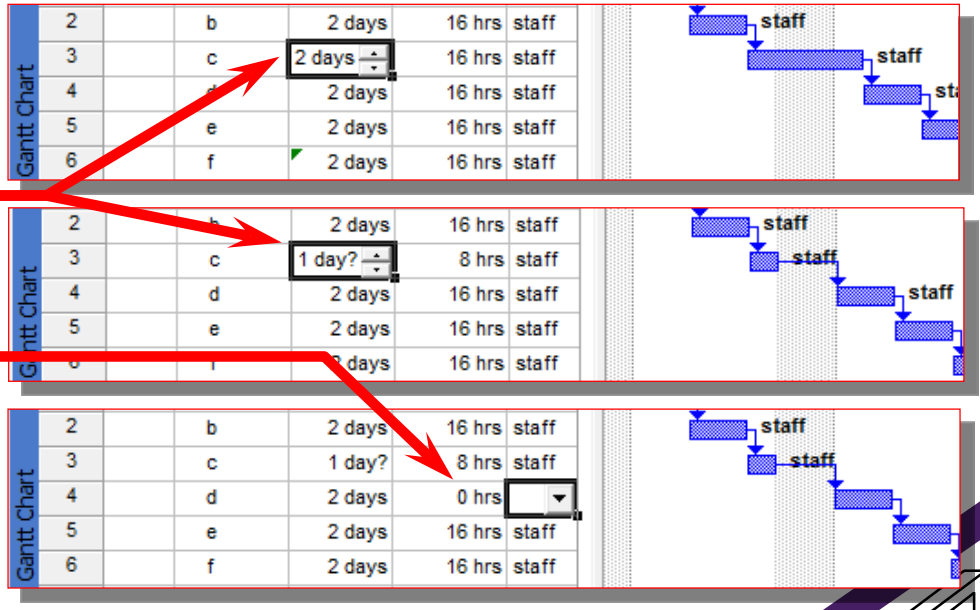
- How '*Delete*' works depends on what is selected
  - If "Name" is selected then a 'Delete indicator' appears and asks your intention
  - If a row is selected then task is deleted
  - If a column is selected it is hidden



- If any other item is selected it is cleared
  - Links & resources (etc) cleared, dates and durations reset



- Deleting resources on a task sets *Work* to zero ☹ *
  (More later)

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* Proof (?) MSPJ is designed by programmers rather than project managers. Deleting resources is often a step in replanning, but that act is in no way an indication that there is no work to be performed, only that duration is for now at least, infinite

Outlining with Summary & Sub-Tasks

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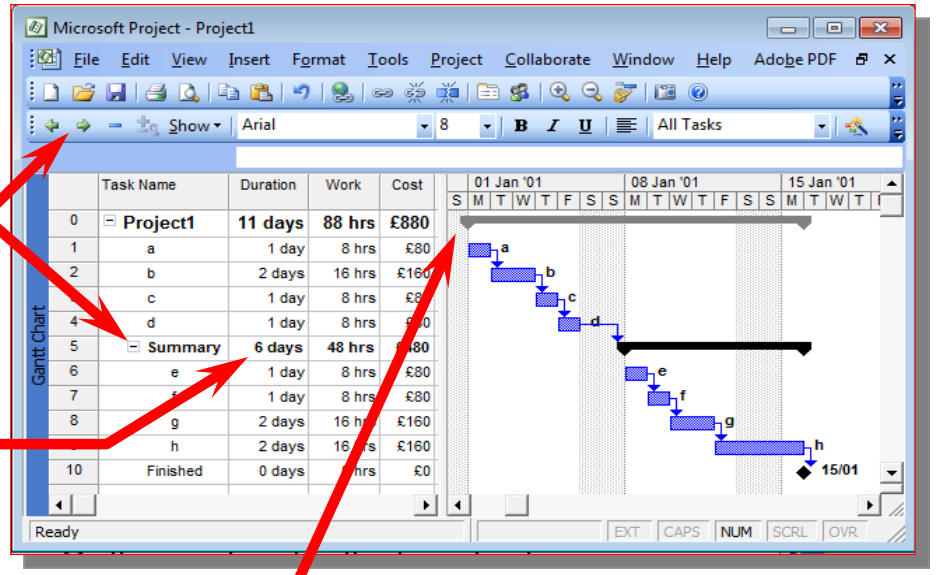
- Summary tasks group & summarise cost, duration etc of lower level items
  - Grouped items may be tasks or lower level summaries
  - Match to the PBS and WBS
- Formatting tool-bar buttons
  - Promote & Demote
  - Expand & Collapse
  - Show a specific level
- Summarise information below
  - Can be collapsed or Rolled-up tasks
  - Summaries can have 'own details' EG
- Project Summary
  - *Tools | Options | View-Tab | Outline-Options | Show Project Summary Task*
  - Project summary name starts as filename: can be changed



More About Summary Task

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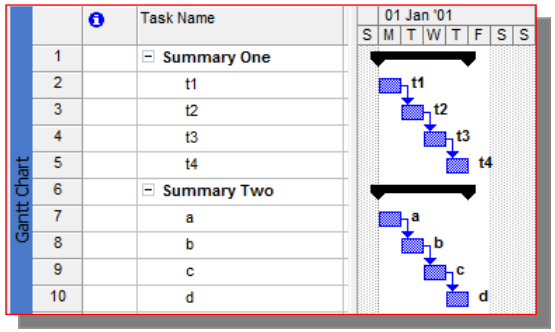
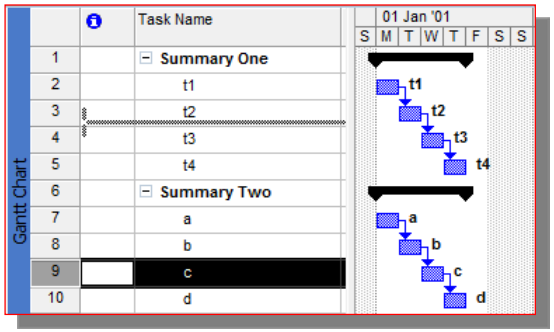
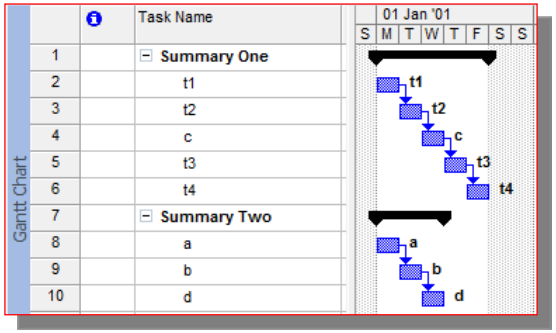
- Tasks are sorted within summary by defaults
  - Tasks always retain ‘membership’ of a summary even if sorted without summary structure
- Links between summary tasks constrain summarised items
  - EG Start dates of summarised tasks cannot be earlier than the summary
- Tracking can be at summary level







- Tasks can be dragged between summaries

PBS → WBS

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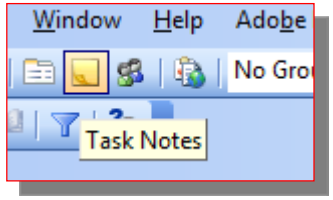
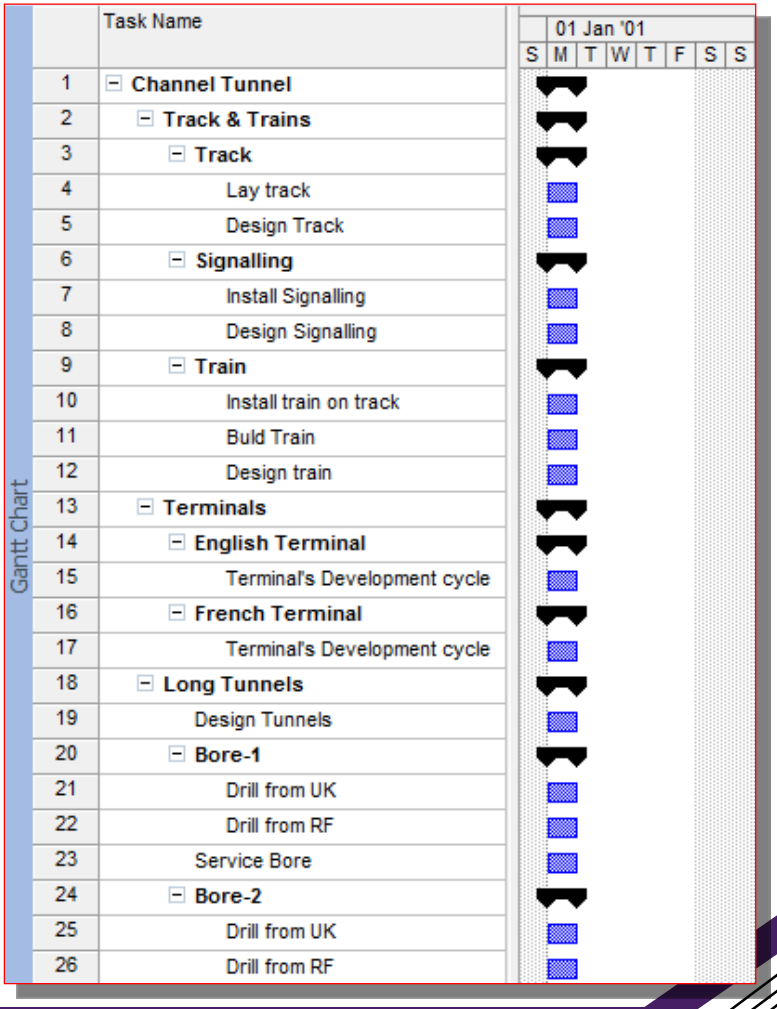
- Outside of the tool
  - Be sure you know the customer's acceptance criteria for each product
  - Use the team's expertise to identify the tasks to meet the acceptance criteria
  - Link product and task to relevant standards in the Quality Management System
    - *Task Information | Notes-Tab | Insert-Object | Create from file…*
    - Or enter criteria directly into the Notes pane (see next slide!)





WBS Dictionary

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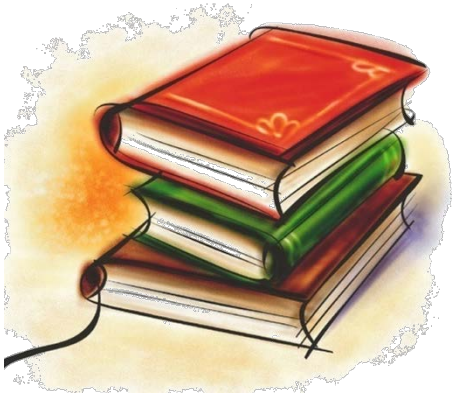
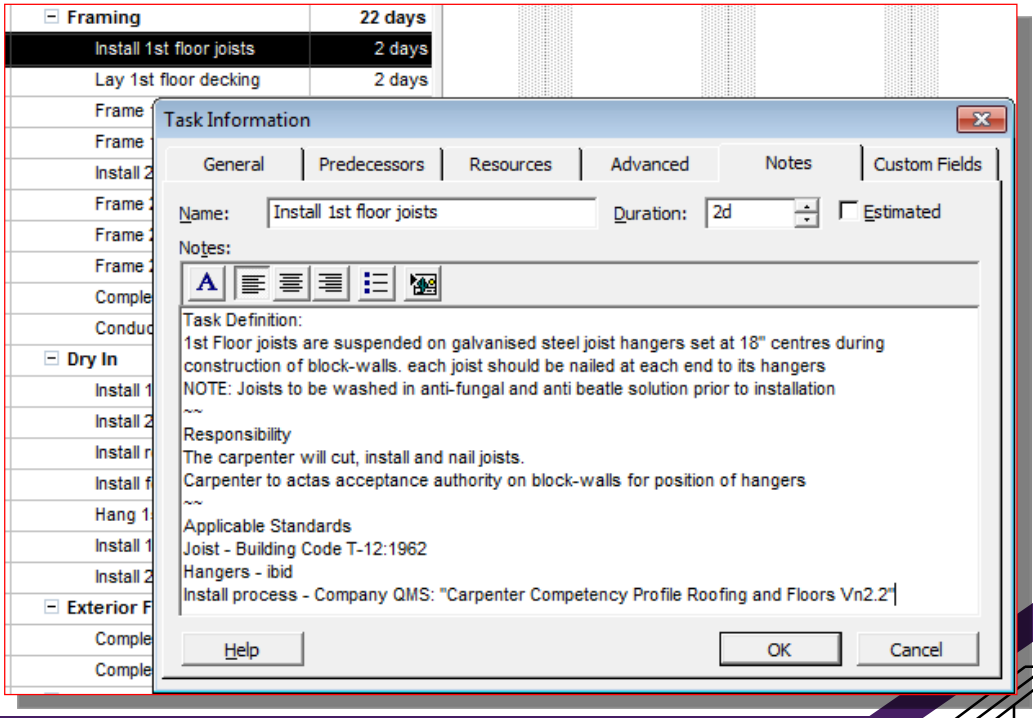
- *WBS dictionary records key* definitions of scope for each element of the WBS
  - Entries also known as a Work-Packages or Contracts or Assignments
  - *WBS Dictionary often actually the SOW*!
  - Defines "HOW" we will do the "What"
    - *Often* extensive *reference to the Quality Management System*
    - Established during Quality Planning (as the PBS is created)





Adding Recurrent Tasks

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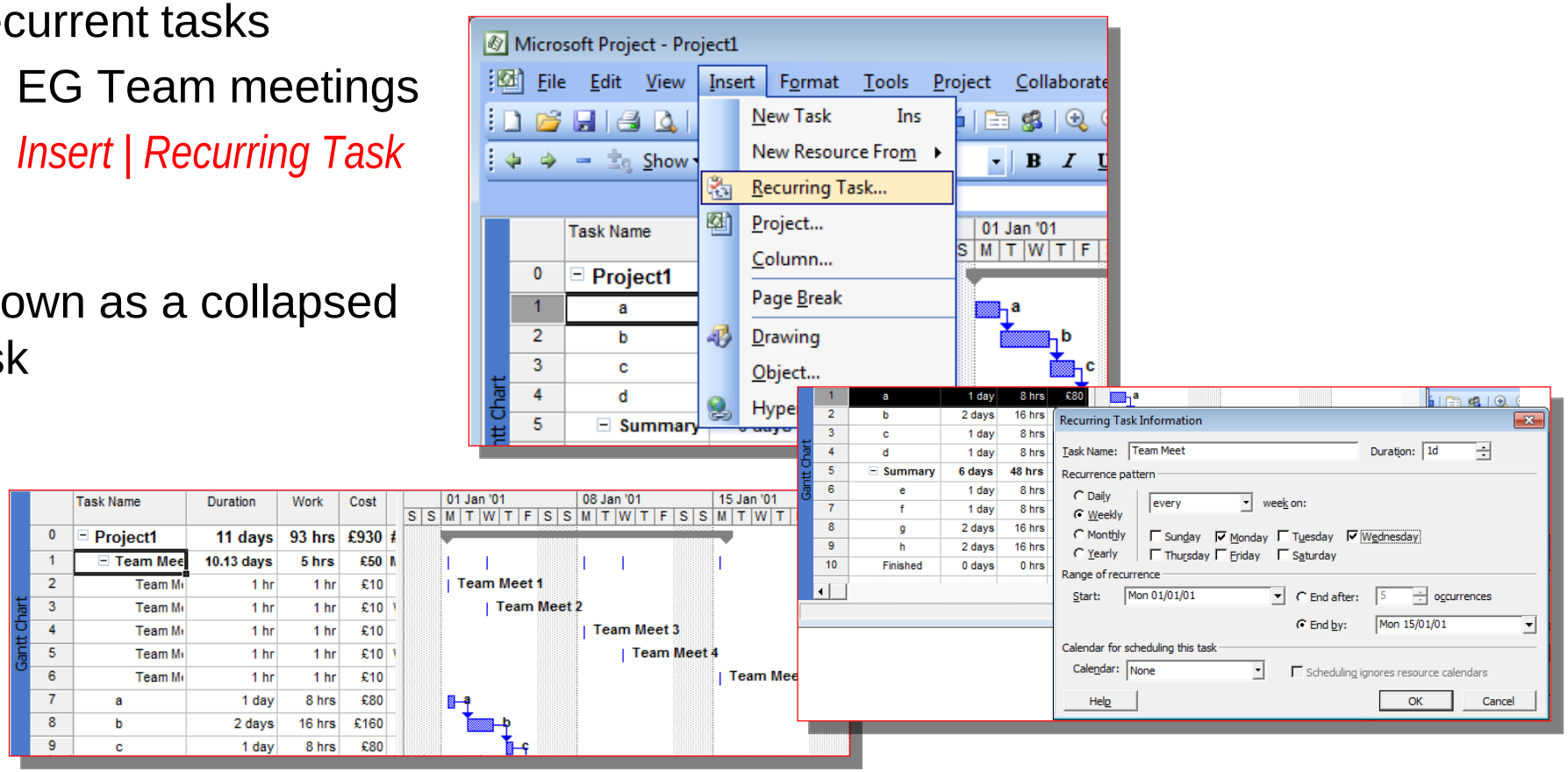
- Recurrent tasks
  - EG Team meetings
  - *Insert | Recurring Task*
- Shown as a collapsed task



WBS Coding

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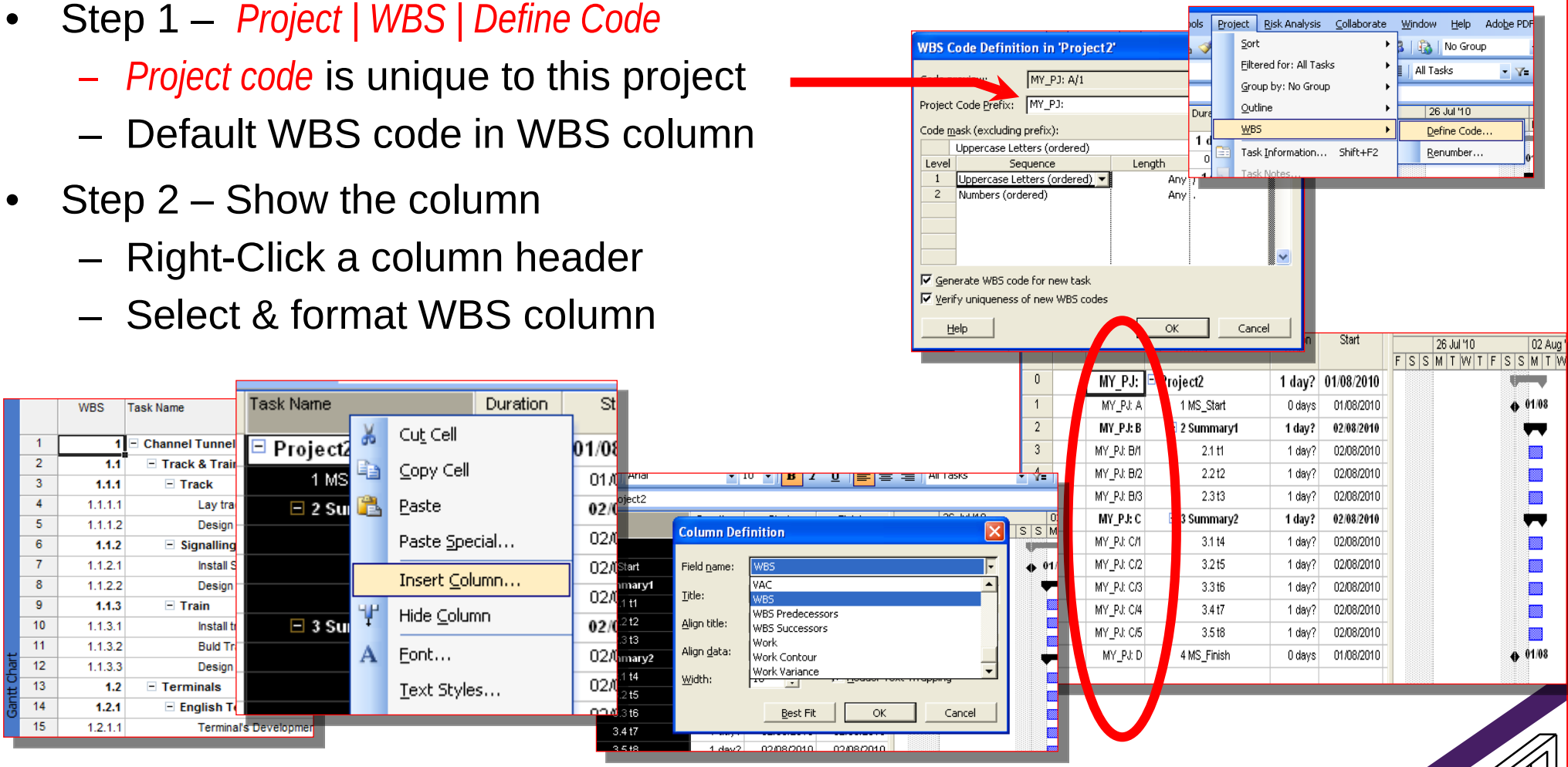
- Step 1 – *Project | WBS | Define Code*
  - *Project code* is unique to this project
  - Default WBS code in WBS column
- Step 2 – Show the column
  - Right-Click a column header
  - Select & format WBS column



Outline Codes & Lookup Tables

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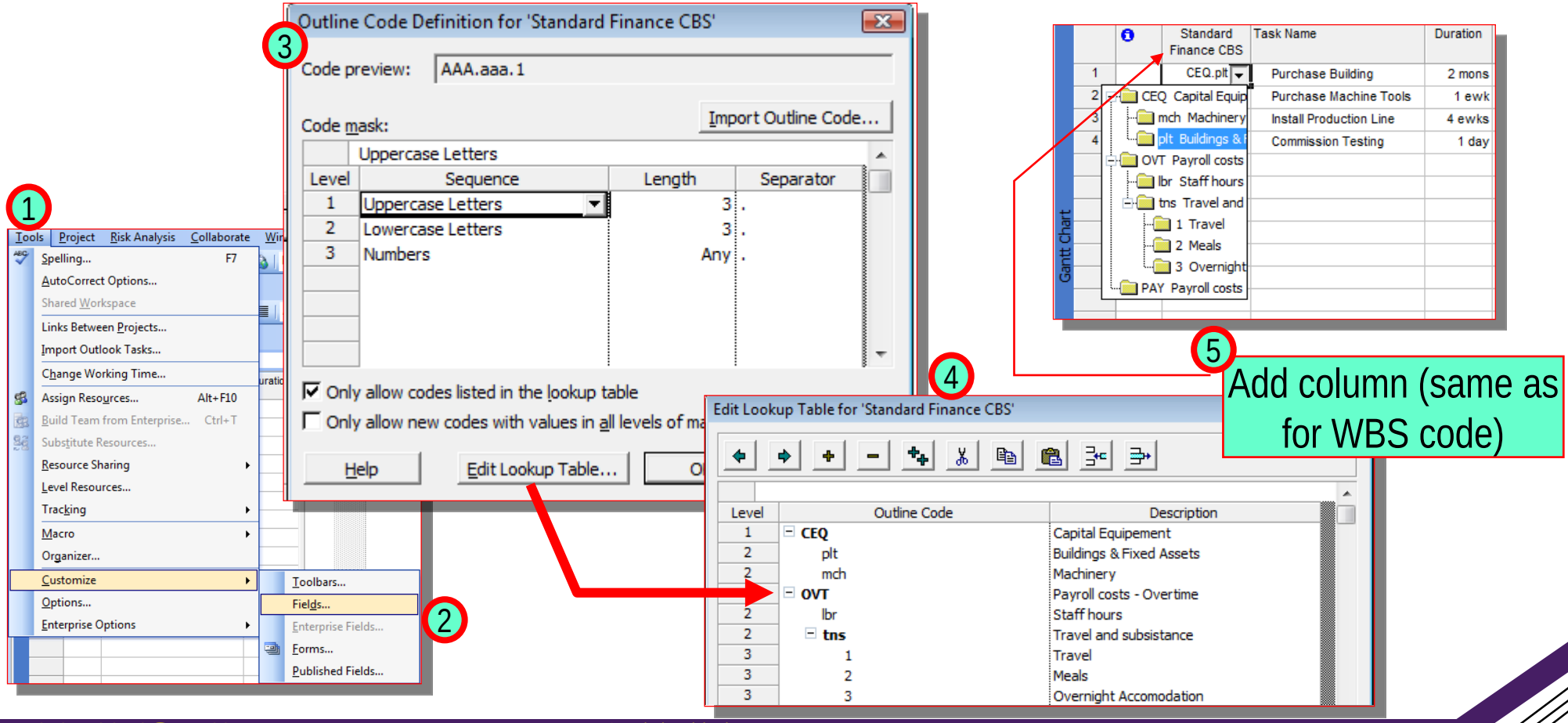
- Beyond the WBS! Multiple outline codes can be created for sorting and grouping



Outline Codes

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- Sadly sort sequence of outline codes can not be defined
  - Set-up codes to sort in required sequences with an alphabetic prefix letter?
- Sorting the final Gantt chart by task start-date is a useful sequencing approach
  - Although not if summary tasks have been used ☹
- Typical steps are:
  1. Enter deliverables and sub-products
  2. Decompose via tasks to create sub-products as sub-tasks
     - Add tasks to integrate sub-products and test deliverables
  3. Link tasks within work-streams and link work-streams within project
     - Link projects within programmes
  4. Sort by start date, baseline, execute project

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Summary

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- Basic skills to navigate in the tool and manipulate elements of the project
  - Selecting & deleting
  - Re-sequencing tasks & inserting simple and recurrent tasks
- At the beginning of a project set-up the project's key info
  - The project information dialogue sets project start (and later status) date
  - We often link documentation to tasks (and resources and assignments)
    - EG To the project summary task
  - Set the Standard Calendar and working times
- Capture project's scope using appropriate analysis skills. Then record details of deliverables and tasks into MSPJ's Task-Column
  - Outlining with summaries (deliverable and/ or phase etc) & sub-tasks
  - Define a WBS code and outline codes
  - Record dictionary information (link to product & process standards)

Practice

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- Some time to explore elements of the controls and ideas in the last chapter
  - The Project Info Window
  - Calendars and Working Times
  - Linking documentation
  - Entering, Selecting, Moving, Inserting, Deleting Tasks
  - Outlining with Summary & Sub-Tasks
  - Adding notes for WBS Dictionary entries
  - Recurrent Tasks
  - WBS Coding, Outline Codes & Lookup Tables

- If using these materials for self-study then consider: LEARNING only occurs when you reflect and experiment with what you've just read
  - Stop and play with the capabilities discussed: just reading WON'T equip you for the difficulties ahead ☹

Other Support Materials

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- The slides in this .pdf are static but almost every slide of the PowerPoint is animated
  - The PowerPoint is available for a very modest fee – see website for details
  - www.logicalmodel.net

- Let me know if a narrated version would be of interest
  - I'm currently undecided whether to invest the effort

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- For further help & assistance
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- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 4

Lesson 4: Building The Network With Dependencies

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Objectives

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- Give ‘real-world’ context for development and maintenance of project baselines
  - Must match Quality Management System processes
  - Precedence network construction must capture activity dependencies
- Use MSPJ capabilities to model and manipulate task inter-dependencies
  - Create milestones
  - Creating dependencies via MSPJ’s Gantt & network views
  - FS, SS, FF and SF* plus Lag, Lead and scheduling constraints
    - Over-Coming an MSPJ limitation: creating Hammock tasks
  - Redefine elements of default Views and using the relationship view
- Exercise: To practice creating PDM networks
- Entering a task’s details with task entry view
  - Introduction to the mechanics of Task-Type and Effort-driven scheduling
- Case Study: Apply learning to define the Case-Study project

* FS is Finish to Start, SS is Start to Start, FF is Finish to Finish and SF is Start to Finish and each is read backwards, thus in FS the constrained task’s START be until after its predecessor’s finish

Development and Maintenance of Project Baseline

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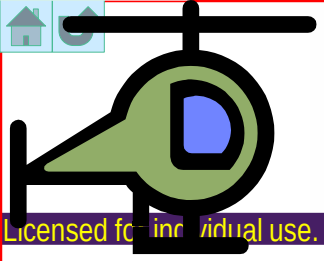

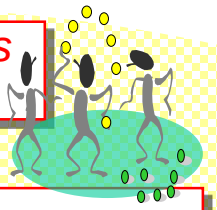

Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

Monitoring, Tracking & Control

Origins of Network Scheduling

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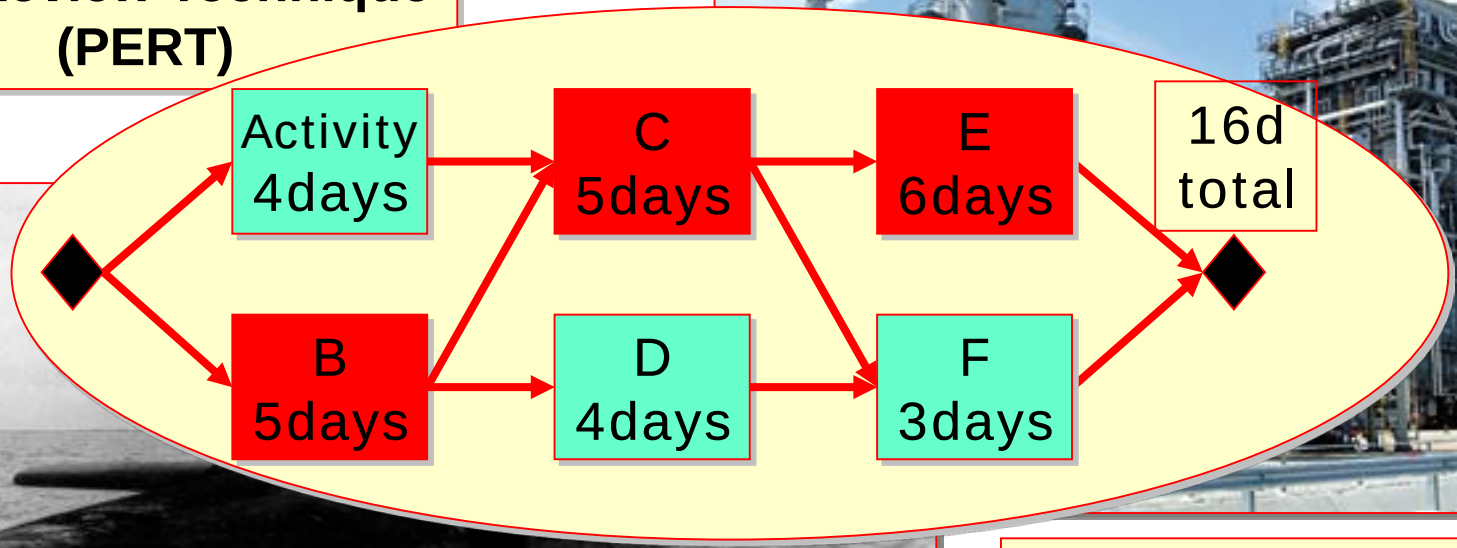
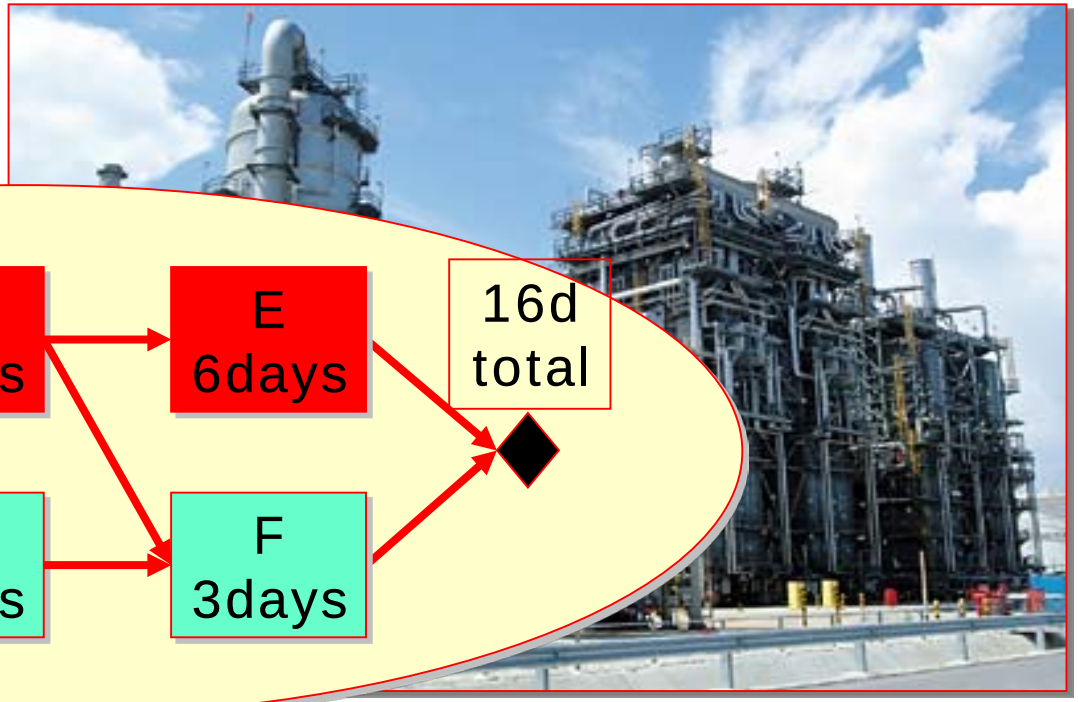
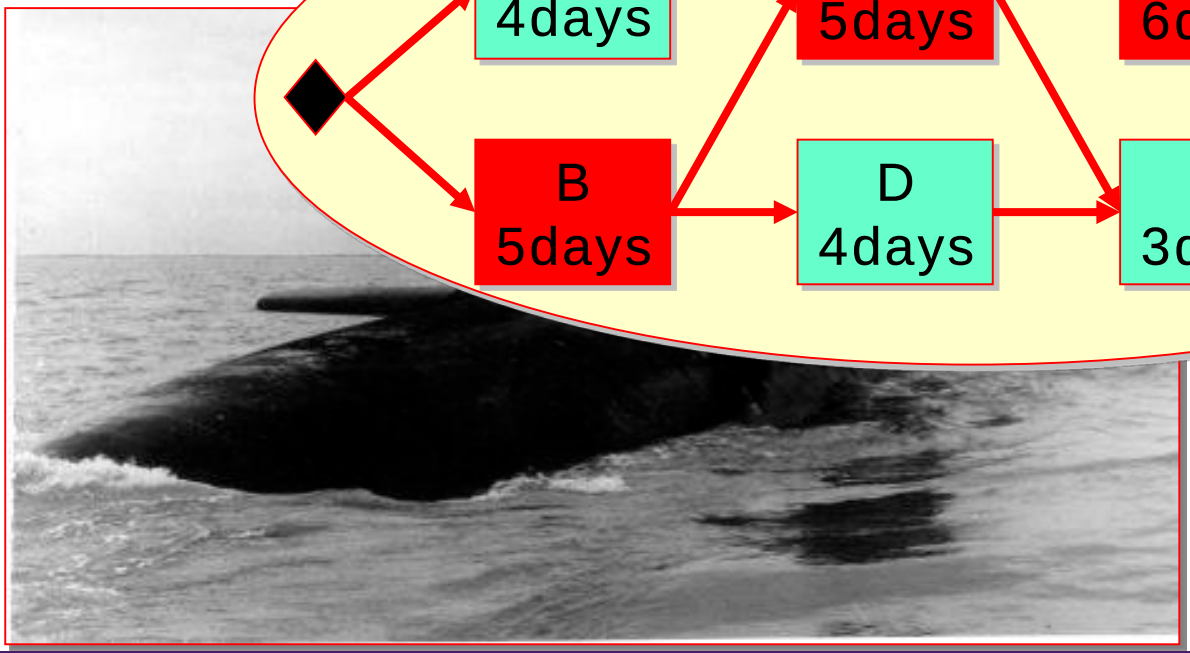
Program Evaluation and Review Technique (PERT)







Critical Path Method (CPM)
aka
Precedence Diagram Method (PDM)

Process Approach

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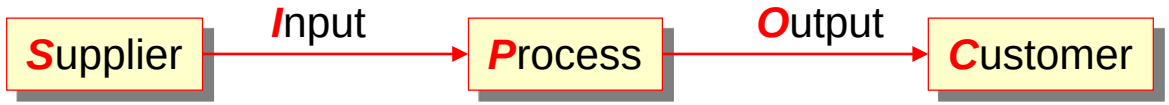
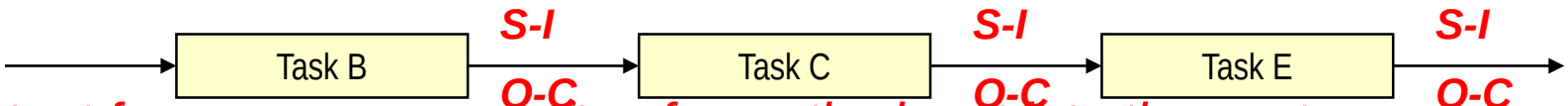
- Most modern management is founded on “Use defined processes”*
- Systematic identification and management of the *processes* employed within an organisation *leads to repeatable performance levels*
  - Including the interactions between the processes





- *Output from one process often forms the input into the next* process
- *Processes define how* resources, information, tasks and behaviours are combined and managed *to produce results*
  - Any activity, or set of activities, that uses resources to transform inputs to outputs can be considered as a process

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* A process approach is “A” not “the” way to create controlled environments. It may be THE way for repetitive contexts where refinement is the goal, but that follows achieving a design that is effective Other approaches are needed where effectiveness (design or solution) is the target.

One Processes Output Is Another's Input

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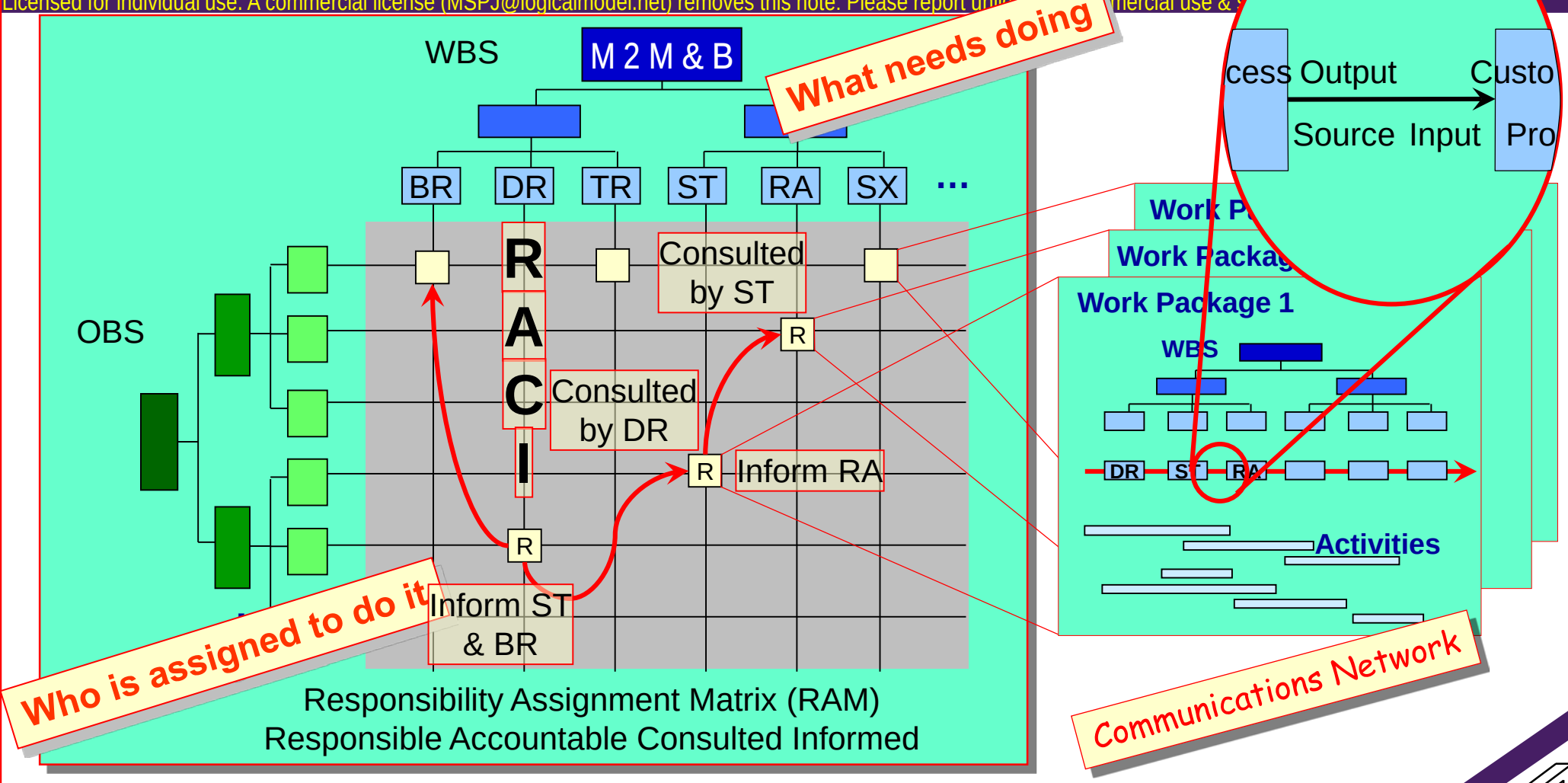

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DR = Design Rocket, BR = Build Rocket, TR = Test Rocket, ST might be Specify Training, RA Recruit Astronaut etc…

SIPOC Example With Quality Measures

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- Network diagram and SIPOC concepts should be used to ensure needs of recipient and intentions of supplier are equivalent (identical?)

Receive Customer's Order				
Supplier	**Input**	**Process**	**Output**	**Customer**
Customer	Dishes required	Capture Order Cook Despatch Food Pass-on Payment	Food	Customer
	Delivery address		Free Fizzy drink	
	Delivery Time			
	Payment		Money	Finance Dept
Whole-Saler	Flour		Provision Low Note	Logistics Manager
	Eggs			
	Foil-Dishes			
Garage	Delivery Sc			
	Petrol			

Cash Handling				
Supplier	**Input**	**Process**	**Output**	**Customer**
Shop-Staff	Cash from cutomer	Pay Cash into Bank	Money	Payroll
Delivery Staff	Cash from cutomer			

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Network Construction Steps

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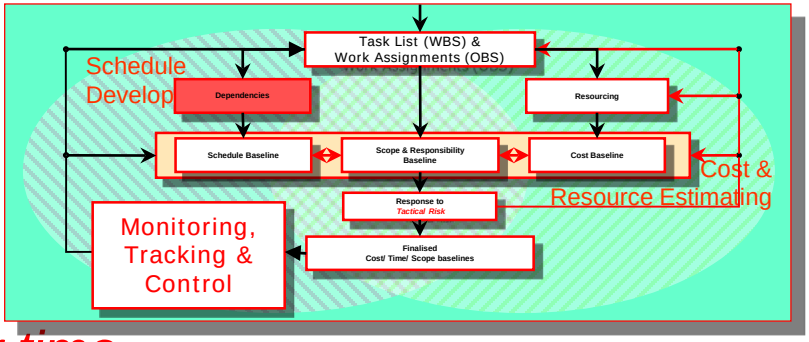
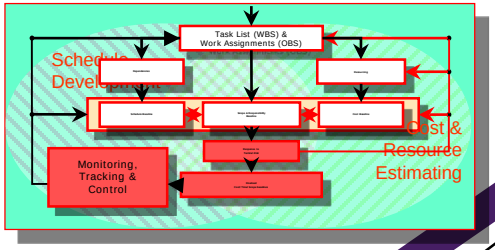
- After tasks and resources are entered
  - Enter dependencies and constraints
  - Enter work (or duration)
  - Assign Resources
  - *Correct MSPJ's calculation of effort over time*



- Compute critical path and resource under and over allocations
  - Apply crashing, fast-tracking, resource substitutions
  - Smooth and levelling

- Baseline and track progress
  - *Where progress is not to plan repeat the above!*
  - *Re-plan to consolidate gains & address problems*



Planning Builds Teams

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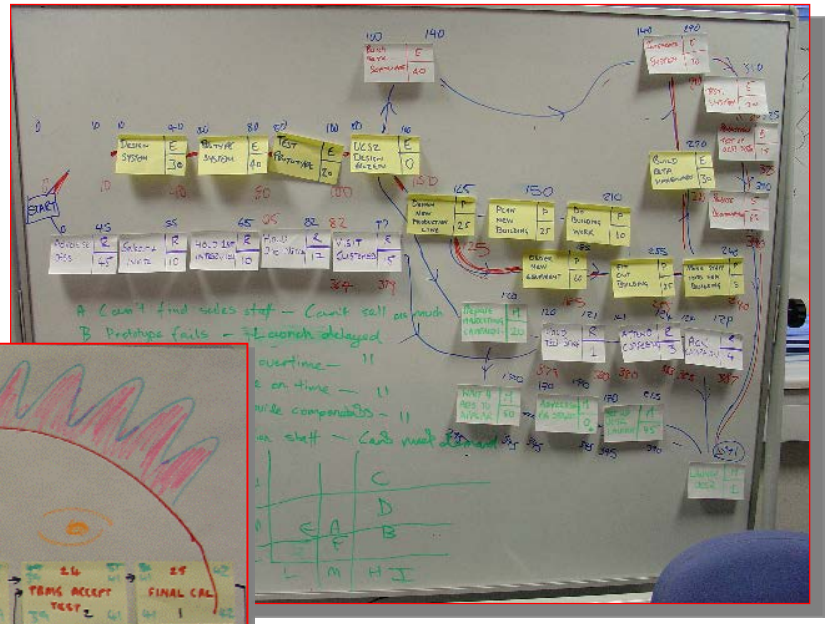
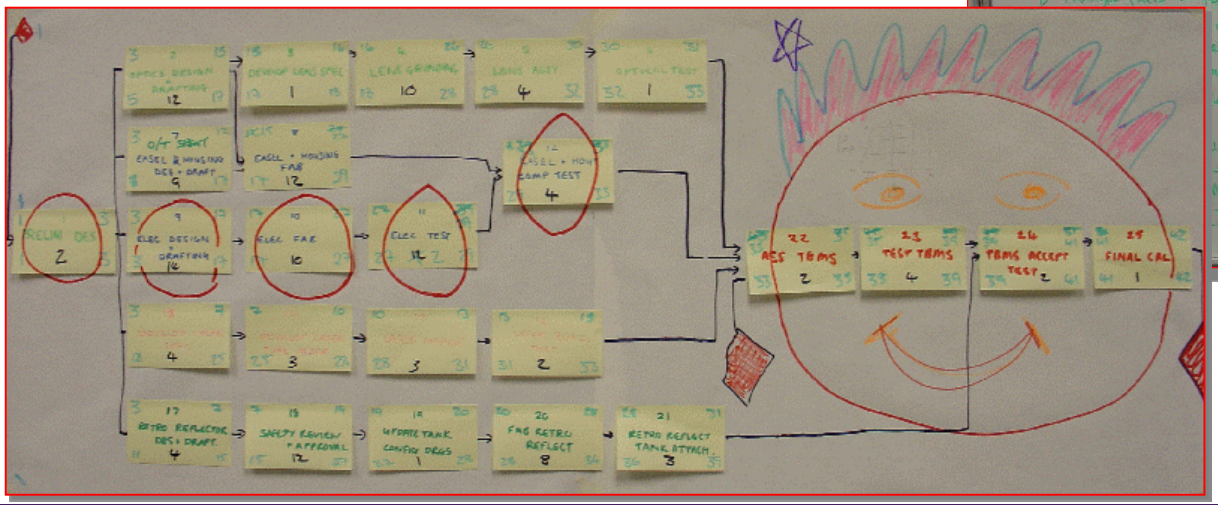
- Done right planning establishes shared understanding and mutual appreciation
  - People have fun and fun projects get delivered
- To build a shared consciousness requires cooperative, social problem definition
  - Motivation results from 1) involvement that promotes 2) understanding plus the freedom to 3) debate the best solution





Rules for Creating Networks

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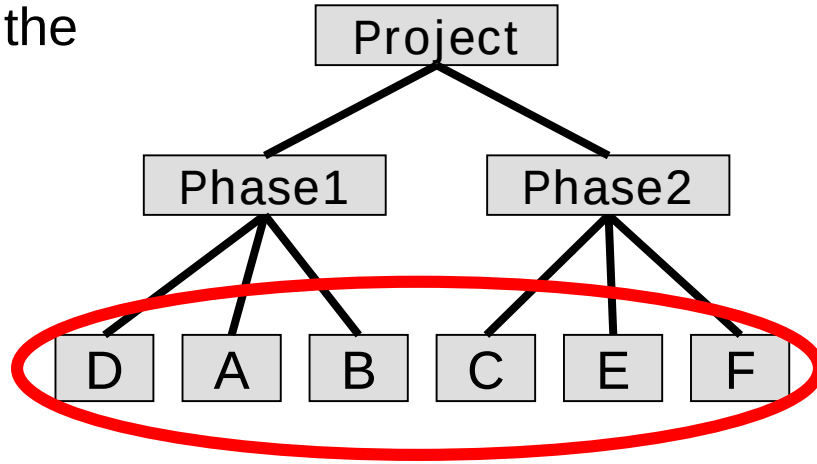
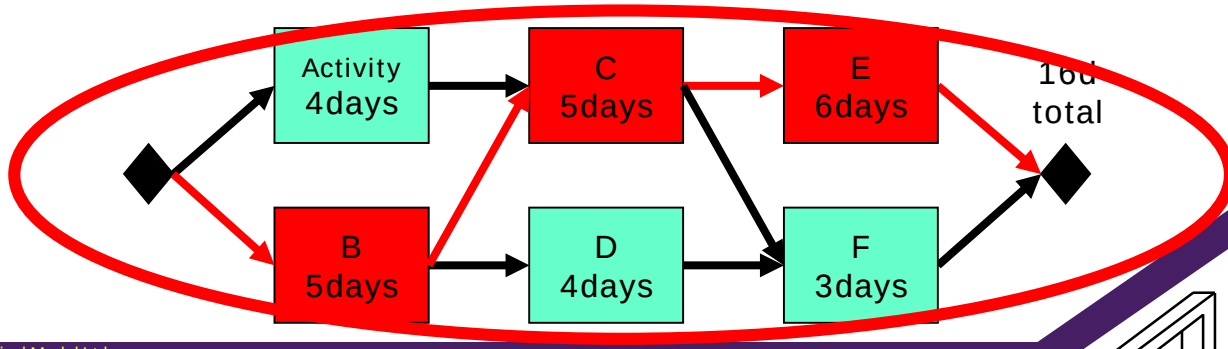
- Standard advise says “Take *just* the *activities* in the WBS to arrange in dependency order”
  - [In MSPJ we can arrange the summary or Planning-Packages tasks too]



- Begin and end with a milestone
  - Milestones at any key coordination point
  - Milestones at completion of key deliverables

- The network includes all Work and Planning Packages from the WBS
  - When Planning Packages are elaborated the network is extended



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Milestones In MSPJ

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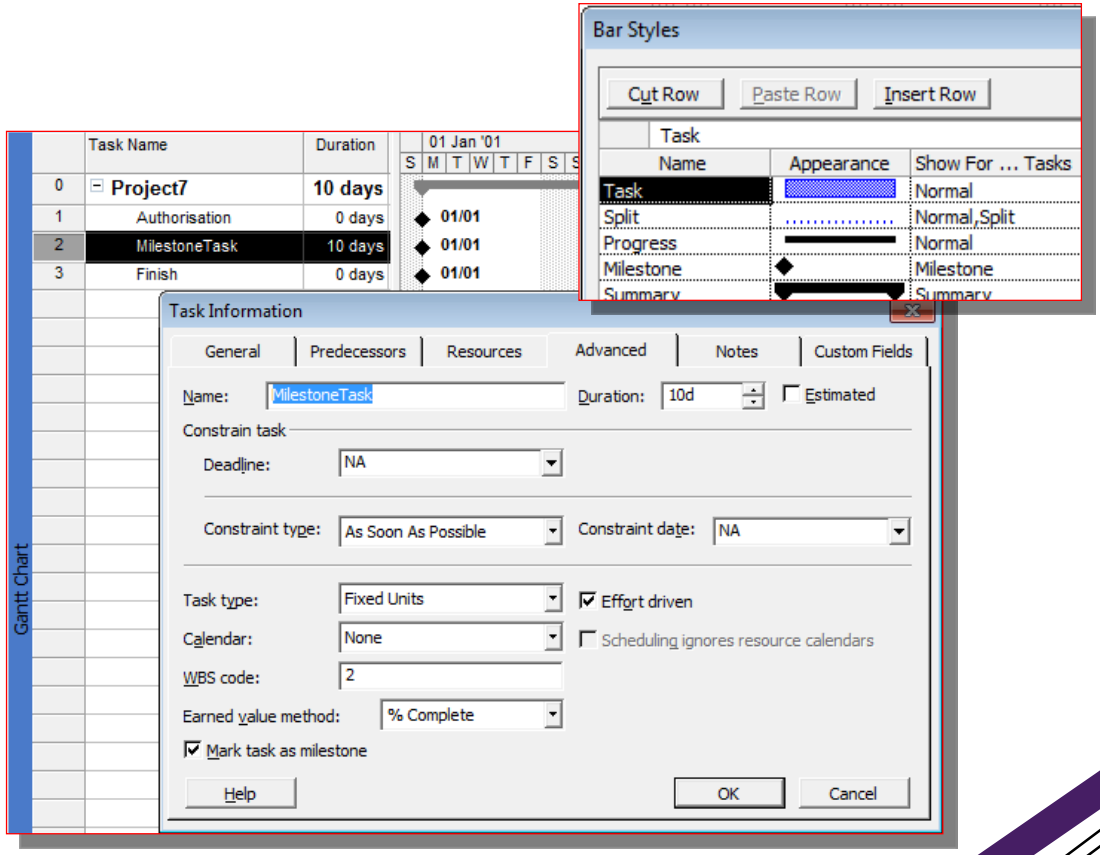
- Any task with zero duration is shown on the MSPJ Gantt as a Milestone
  - So is any task whose *Task-Information | Advanced | Mark task as Milestone*
  - Default is a "♦" at task Start
  - I recommend you DON'T set tasks as Milestones unless you change the Bar Style to show duration (explained later)
- Add milestones at all points where coordination or review and approval is key
  - Milestones are recognition of tests applied and passed



Calculating Dependencies

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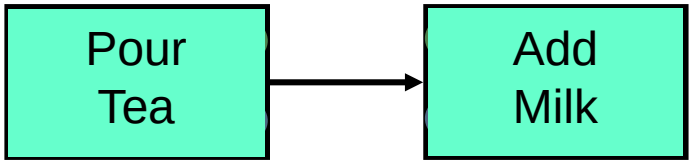
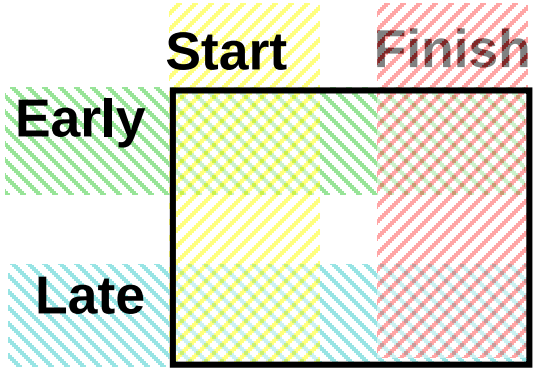
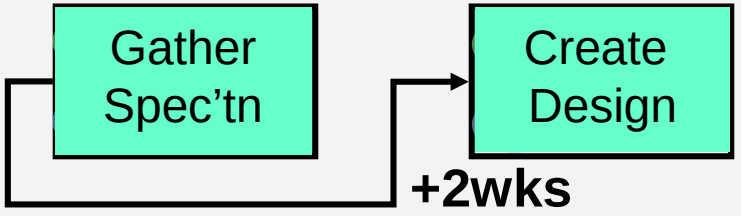
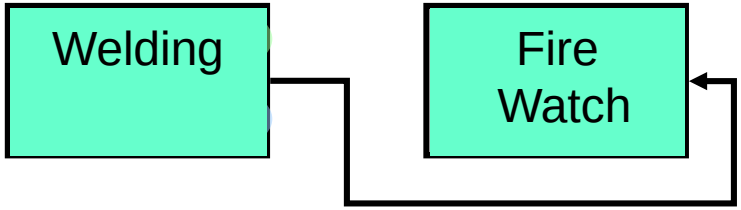


Finish-i permits start-j
Normal Relationship

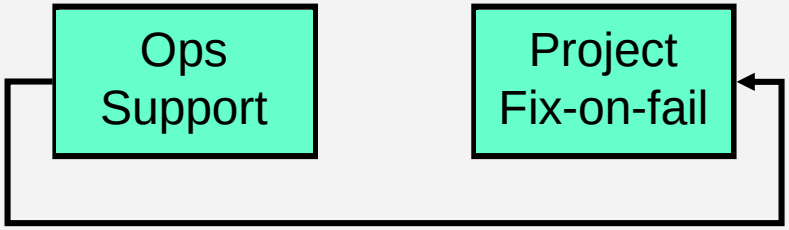




Start-i permits Start-j
Commonly an optimisation of a more detailed underlying set of F-S relationships



Finish-i permits Finish-j
Rare. Usually end of monitoring activity



Start-i permits Finish-j
Rare. Usually handover on acceptance

There is no timescale in a network diagram

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Scheduling Requires Describing Dependencies

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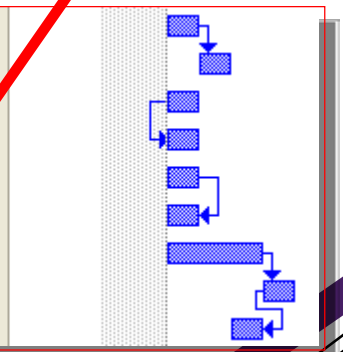
- **<u>Without dependencies all the power of MSPJ is lost*</u>**
- Every task's starting and finishing dependencies should be set
  - Limiting case is project (or summary task) start and finish milestones
- Three of the possible dependencies must be specifically 'spelt-out' to MSPJ
  - FF – Finish of one task caused the end of some other task
  - SF – Start of a task terminates something else
  - SS – Start of something also starts something else
  - The default is understood by MSPJ: FS – Finish one task and start the next
- Dependencies may have delays and overlaps
  - Possible to create complex, meaningless dependencies

task1	1 day?	30/06/2008	30/06/2008		3
task2	1 day?	01/07/2008	01/07/2008	2	
task3	1 day?	30/06/2008	30/06/2008		5SS
task4	1 day?	30/06/2008	30/06/2008	4SS	
task5	1 day?	30/06/2008	30/06/2008		7FF
task6	1 day?	30/06/2008	30/06/2008	6FF	
task7	3 days	30/06/2008	02/07/2008		9
task8	1 day?	03/07/2008	03/07/2008	8	10SF
task9	1 day?	02/07/2008	03/07/2008	9SF	



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• Is 2010's dumb-down of capabilities a mistake? People find 'instant expertise' impossible. Equally MS desires to sell more copies of the software so reverts it to the populist demand to "draw a picture that is a good-enough con to get the funding" ☹

Linking Via The Gantt View

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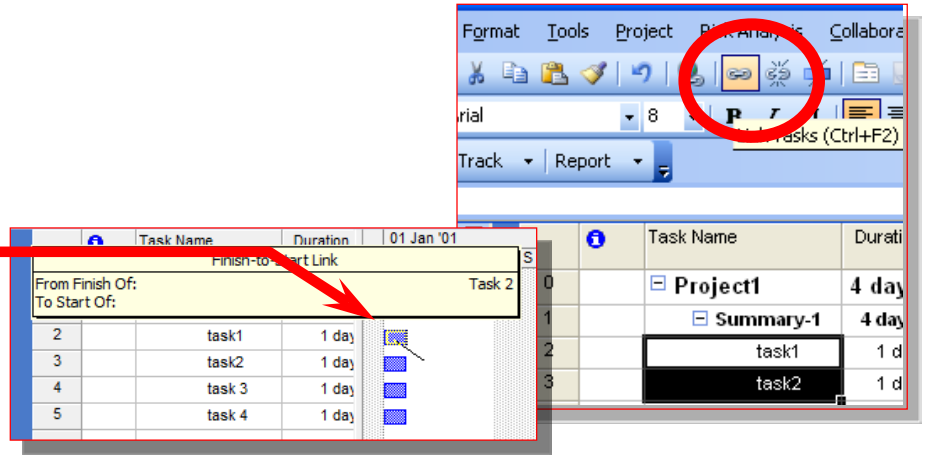
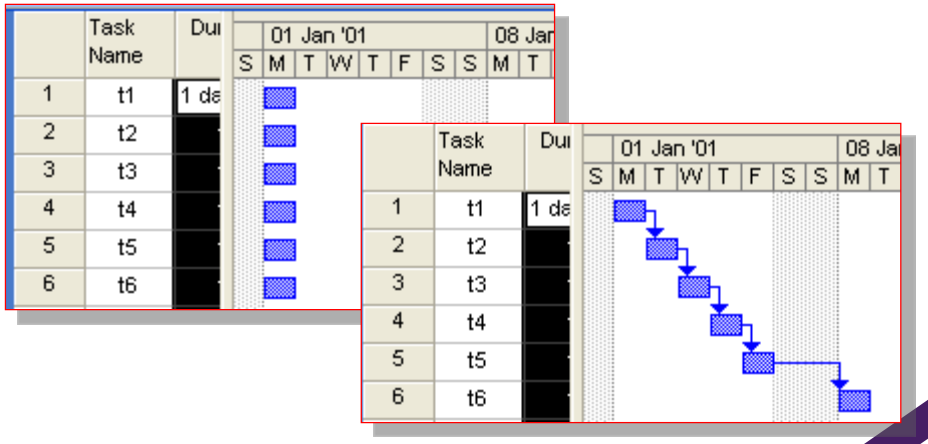
- Select two tasks
  - *Click* the first, *Ctl-Click* the second
  - *Click* '*Link-Tasks*' or type *Ctl-F2*
  - or *Drag between their Gantt bars*
    Start by dragging downward IE Take care not to drag the task's dates!



- To create a sequence of FS dependencies
  - *Click+Drag* to select a set of tasks
  - *Click* '*Link-Tasks*' or use *Ctl-F2*
  - Tasks are linked 'top to bottom' if selected with shift or dragging
  - <u>Task are linked in order selected if selected with *Ctl*</u>



Linking Via The Network View

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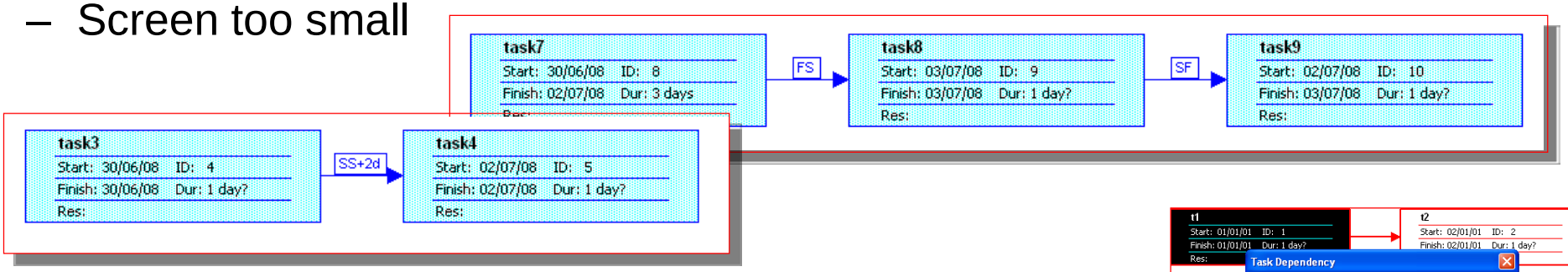
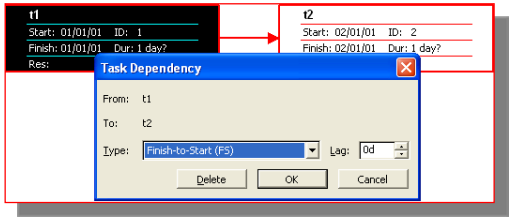
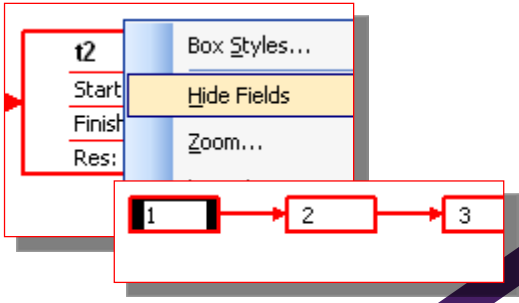
- Network view SHOULD be the best tools – IMHO* it is 'awkward' !
  - Graphics cannot show correct dependency layout
  - Screen too small



  - To link tasks click in one task and drag to the other
    - FS dependency created (double-click the link to change)



  - To show just ID *Right-Click* background | *'Hide Fields'*
    - Hover the cursor over a node to expand it
    - Useful to define a Box-Style of just *'Name'* (Details shortly)



  - Tasks can be added by Click & drag the background

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* IMHO = In My Humble Opinion

An AON Network Example

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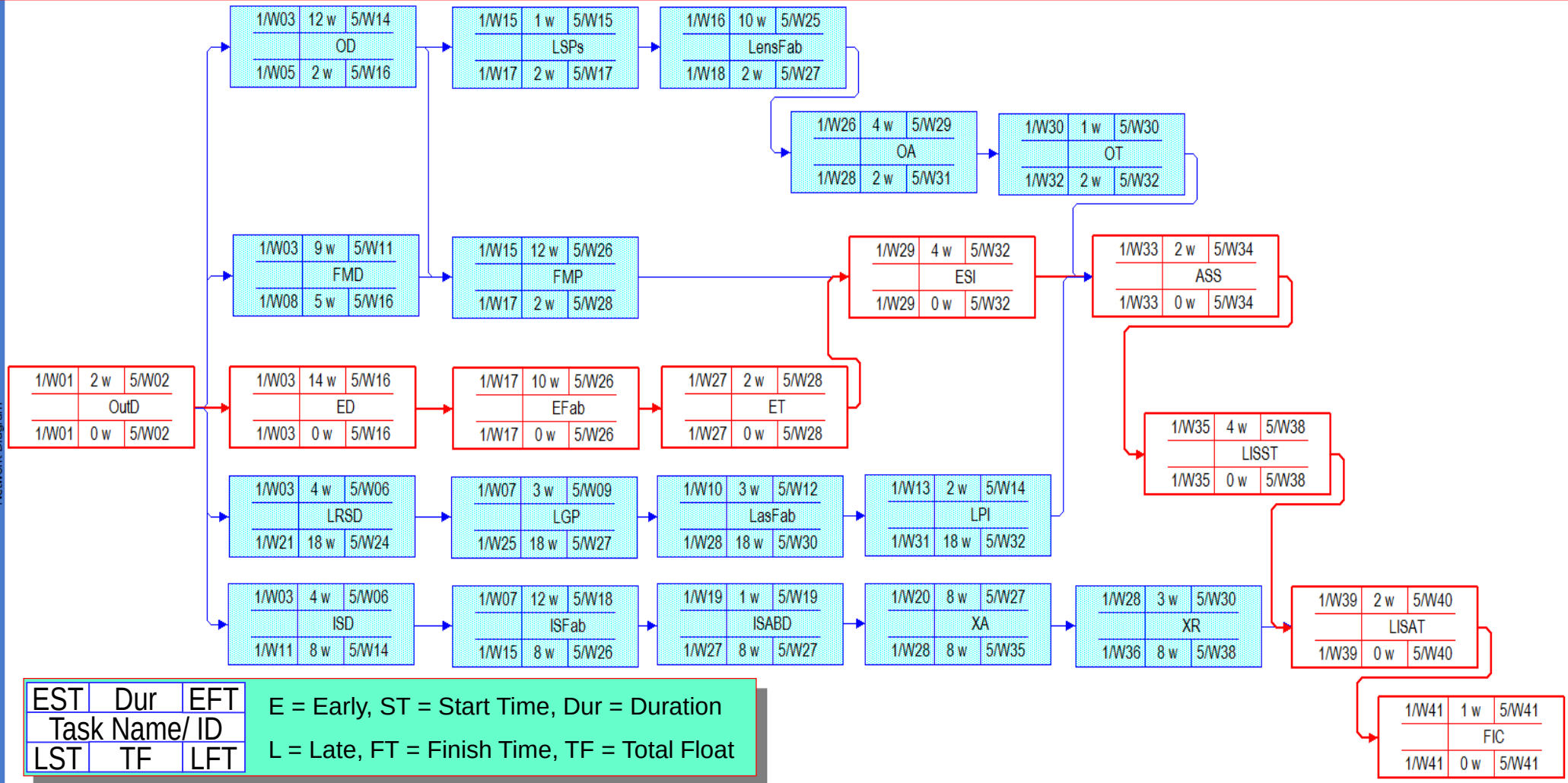

Network Diagram

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Classic Activity on the Node Network Syntax

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- Activities recorded in boxes
  Durations, dependencies, resulting start, implied finish dates and total float
- Conventional layout shows the options available when scheduling
  - Earliest possible means “when honouring constraints”
  - Latest possible means “and still achieving the critical path”
  - Acceptable delay means “difference between Earliest and Latest”

Early Start Time	Duration	Early Finish Time
Task Name (WBS Id)		
Late Start Time	Total Float	Late Finish Time

Start Monday AM	3 Elapsed Days	Finish Wednesday PM
Build Wall		
Start Wednesday AM	2 Elapsed Days	Finish Friday PM

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This syntax is used in the IPMA-D exams and frequently is the preferred layout in reality.
It is not the MSP default but is easily defined as a style (details on next few slides)

Creating the Classic Syntax*

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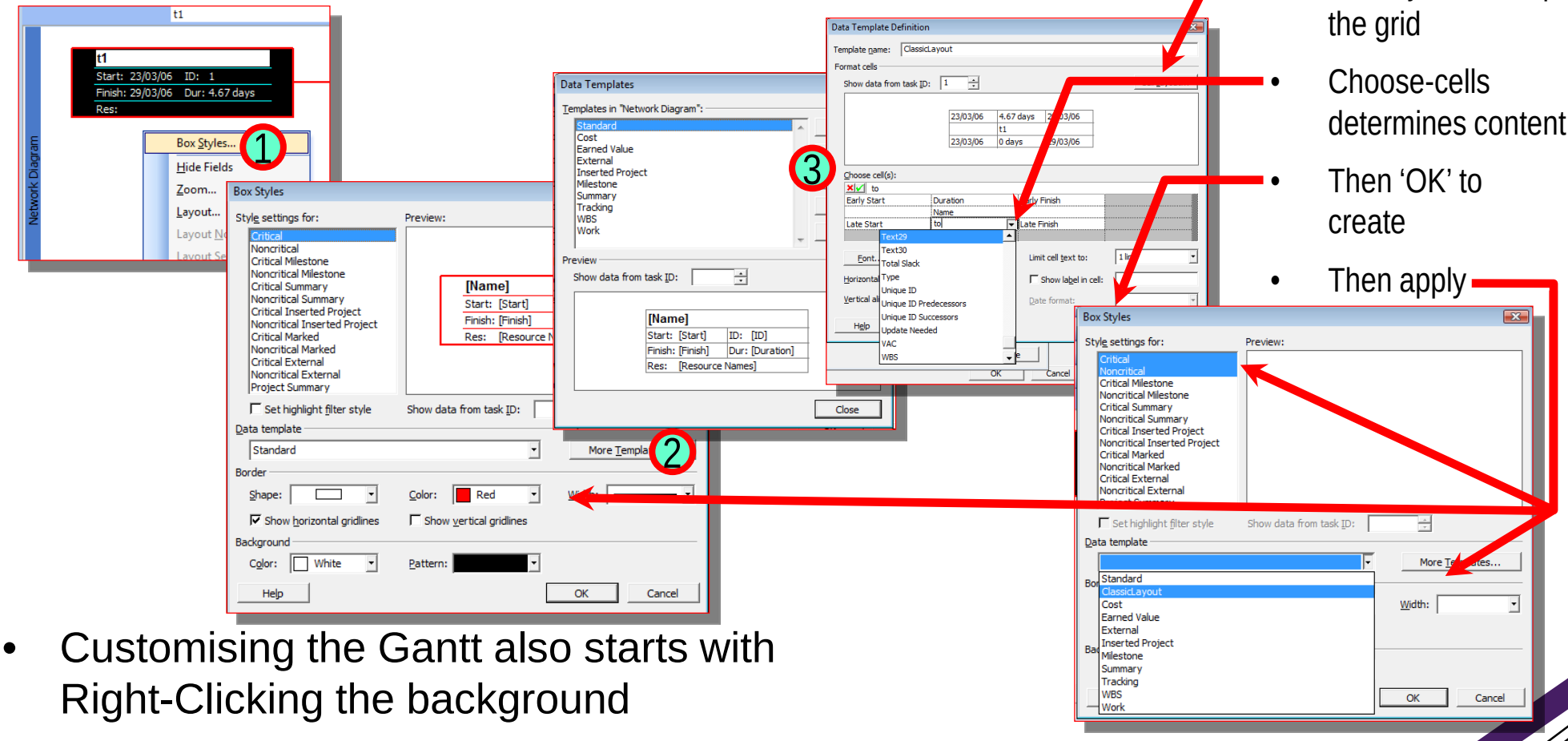
- Start with *View | Network Diagram* and *Right-Click* the background



- Cell-layout sets up the grid
- Choose-cells determines content
- Then 'OK' to create
- Then apply

- Customising the Gantt also starts with Right-Clicking the background

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* Also follow these steps but with 1 row 1 column Cell-Layout to create something economical with screen space. Assign just Name as the cell's contents for transcribing workshop results into the software

Lead and Lag Dependency Constraint Modifiers

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- Dependencies may be subject to delays (“lag”) and overlaps (“lead”)
  - EG The lag while waiting for a ‘long-lead-time’ item*
- Lead time is overlap between tasks that have a dependency
- Lag time is a delay between tasks that have a dependency

**AM Wed Wk1	1 Day	**AM Thu Wk1
	Order Mast (WBS Id 3.6)	
**AM Fri Wk8	Acceptable Delay (Float or Slack)	**PM Fri Wk8

FS + 6wks

AM Thu Wk 7	1 wk	AM Thu Wk8
	Install Mast (WBS Id 3.7)	
AM Mon Wk14	Acceptable Delay (Float or Slack)	Latest Possible Finish

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*Note potentially confusing terminology ** Note Alternate date handling Use one or the other style

By Default MSPJ ONLY Creates FS Dependencies

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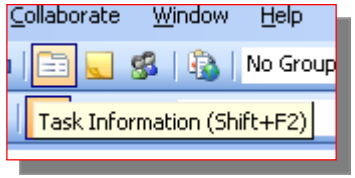
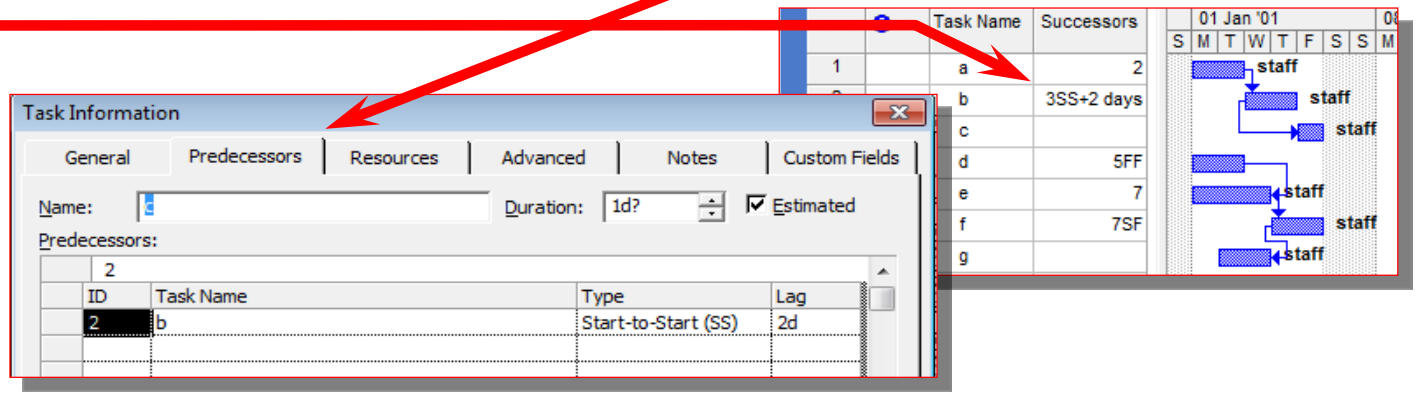
- All dependencies can be created and delays and accelerations included
  - Open a task's *Task-Information* | *Predecessor-Tab*



    - Or add the predecessor column to any table and use 'modifiers' to spell-out dependency type SS, SF, FF
    - Use "+" or "-" for Lag & Lead
  - Lead = overlap
    - Lead is –ve
  - Lag = delay
    - Lag +ve



  - Updates via *Task-Information* applied to <u>all currently selected</u> tasks

Entering Lag and Lead

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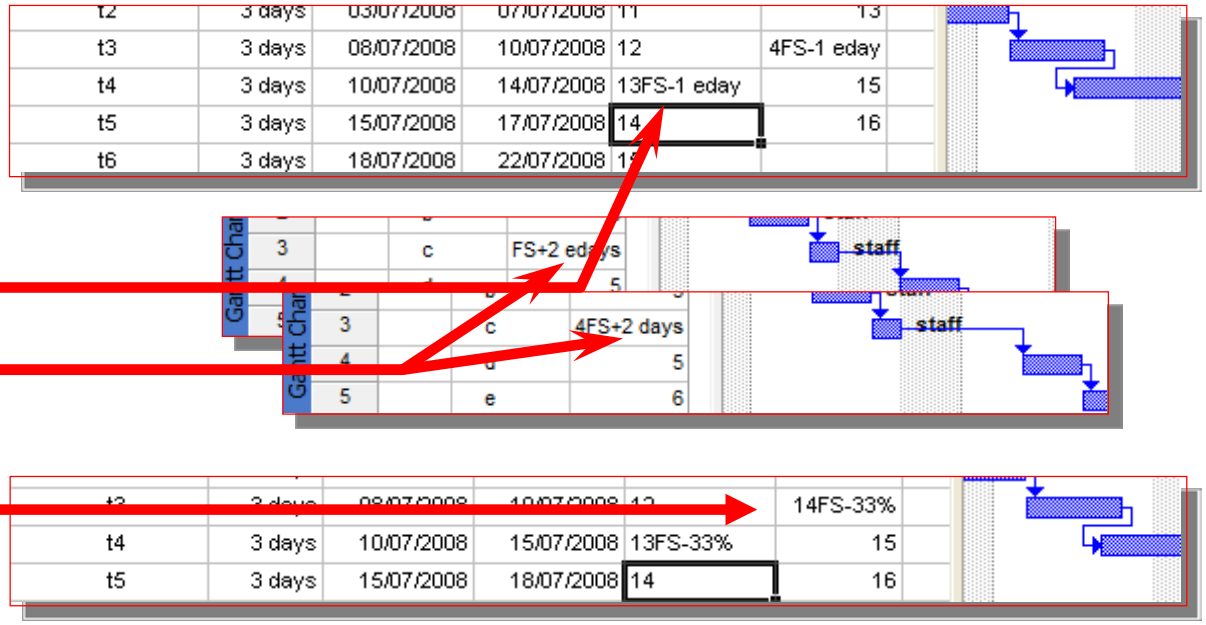
- Lag and Lead can be typed directly into the Predecessor (etc) column of any suitable table
  - As a duration EG “1” or “1wk”
  - As elapsed EG “-1ed”
    - ‘Elapsed’ will affect scheduling
  - As a %age duration



- Lag & lead apply between two tasks
  - Possible to also have delays between a task’s dates and an assignment’s dates

Changing and Deleting Links

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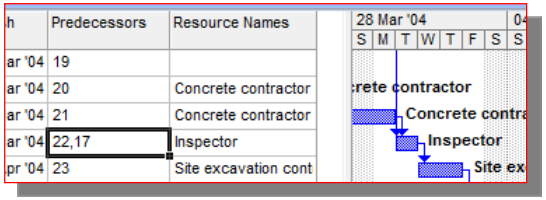
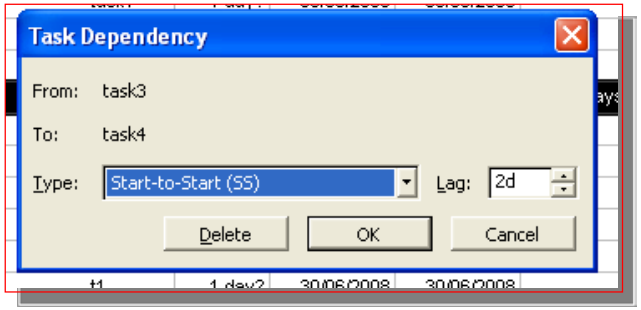
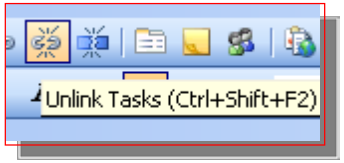
- Delete links by selecting the predecessor cell and type *Delete*



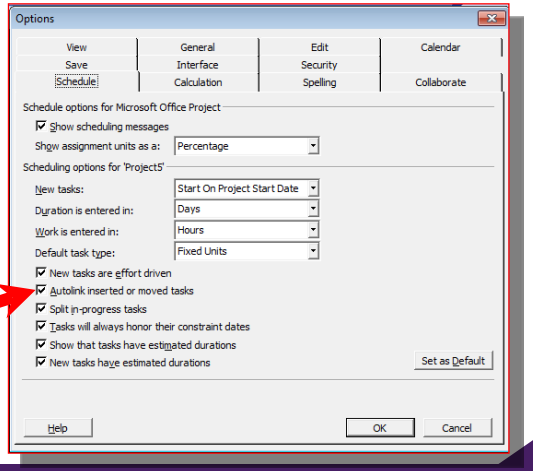
  - *Double-Click* links to change or *Delete* them



  - The *Un-Link* button removes all links from a task!



- Automatic linking
  - *Tools | Options | Schedule-Tab | Autolink Inserted or Moved Tasks*



Creating Hammock Dependencies 1/2

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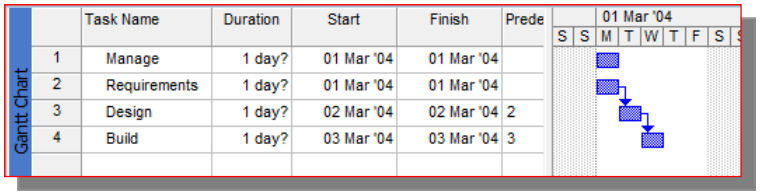
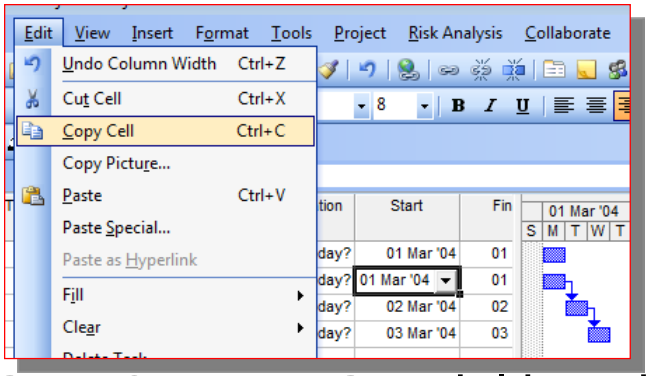
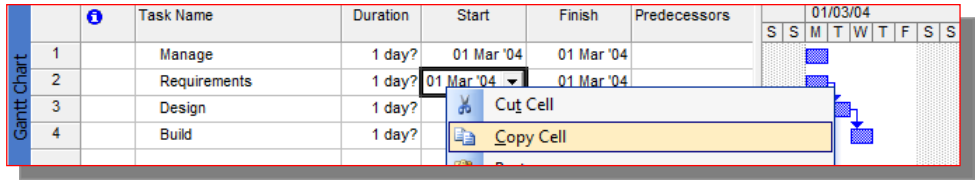
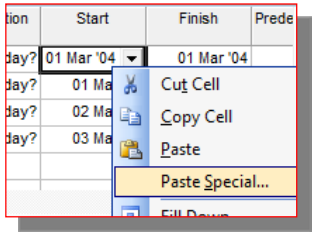
- A hammock task is one whose start date and finish date are dependant on (linked to) other tasks
  - Start point: An unlinked hammock ("Manage") and its dependencies

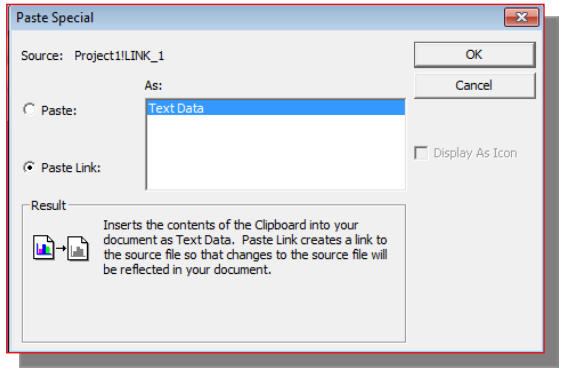


  - Step-1: Copy the Start-Date of the first task









  - Step-2: Paste-Special into the dependant hammock task

Creating Hammock Dependencies 2/2

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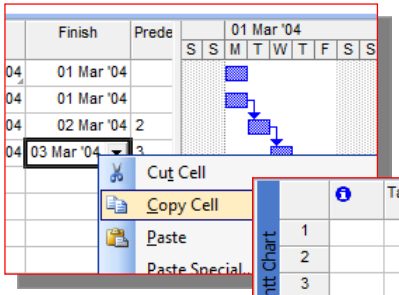
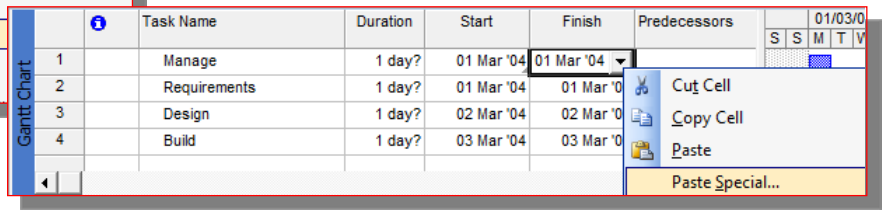
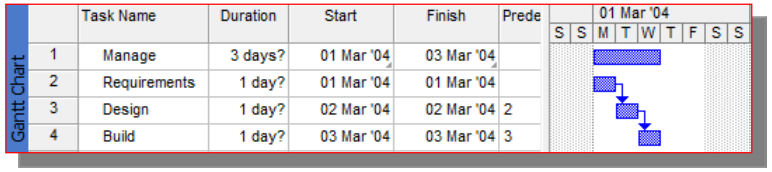
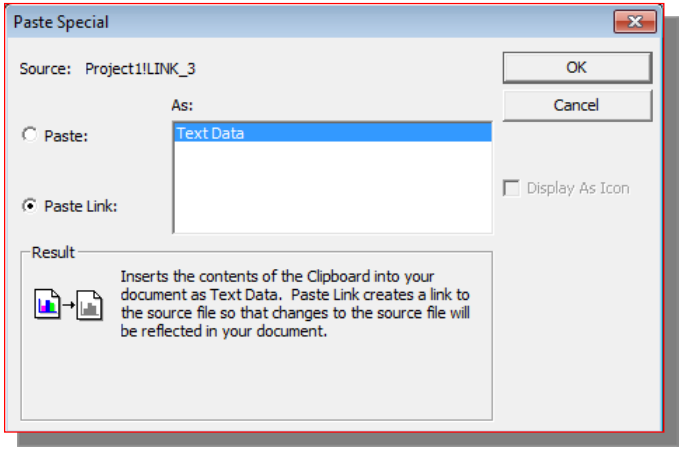
- Step-3 & 4: Repeat procedures for End-date of last task

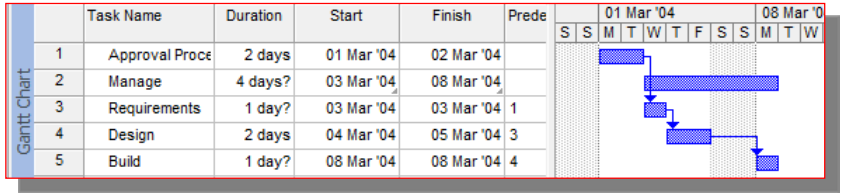
- The result is a task whose dates and duration depends on the contained tasks











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Relationship View

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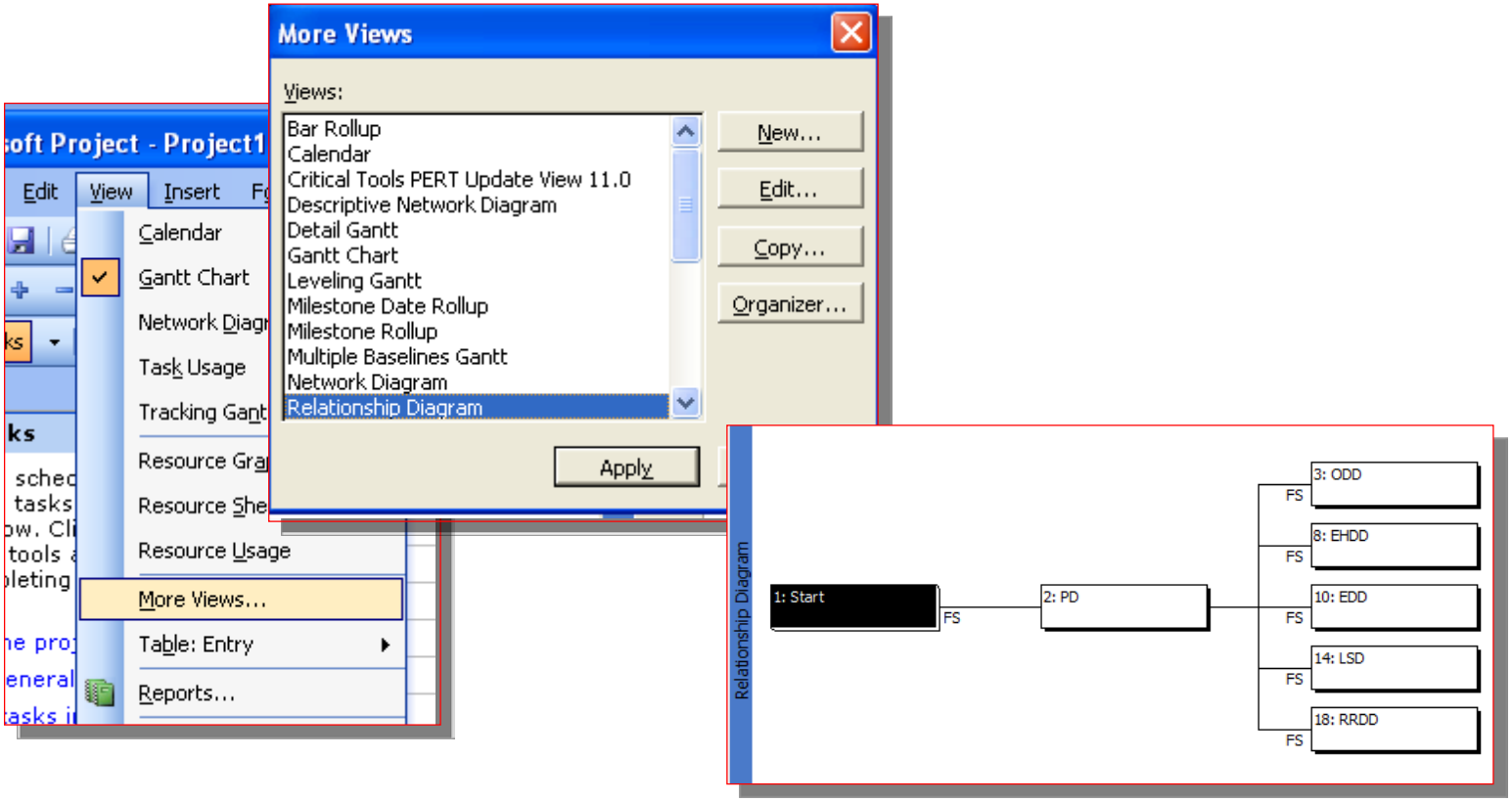
- To see all the links a task has use the relationship view
  - *Views | More Views | Relationships*



Exercise-1: PDM (By Hand)

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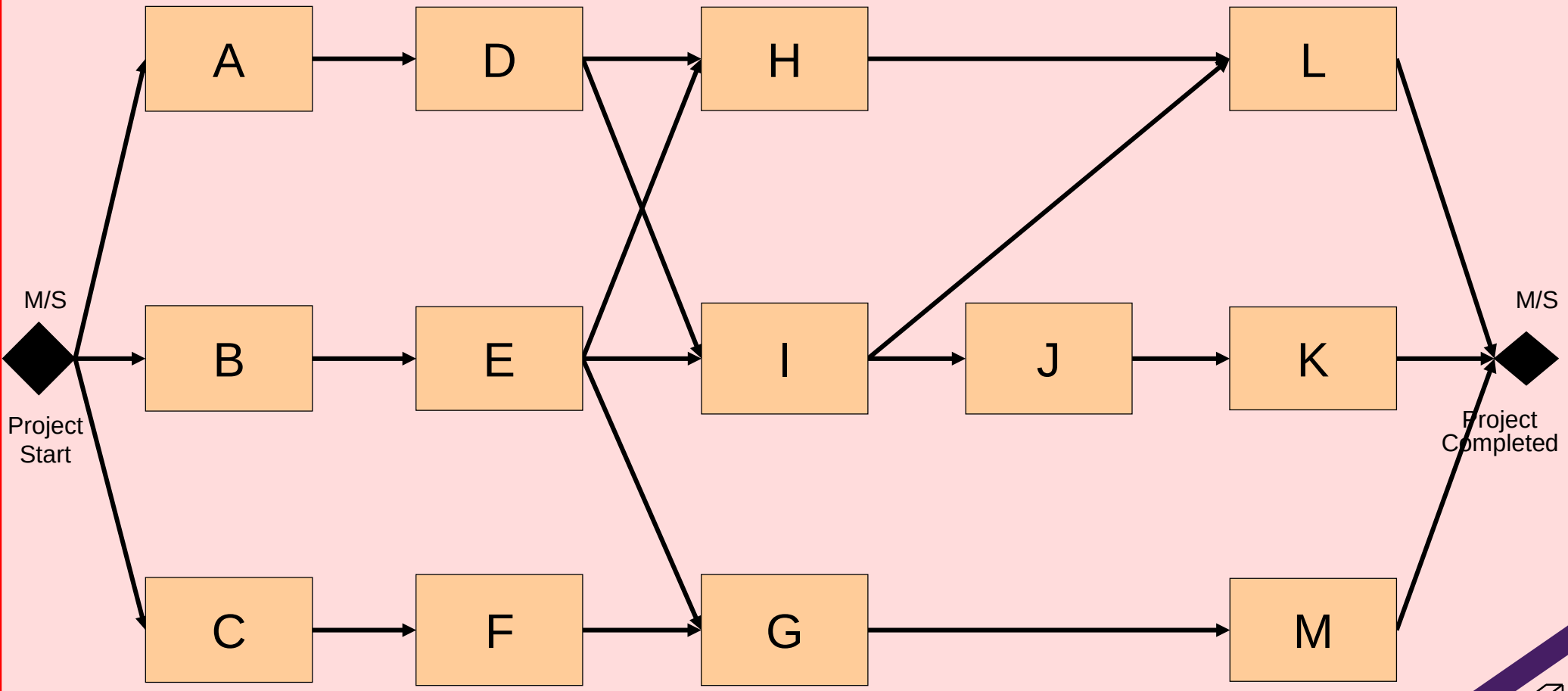
- We will practice this in MSPJ before tackling a Case-Study's tasks etc.
- *Step 1:* Open MSPJ, create a new project file, and enter the list of tasks
  - *Step 2:* Link them using a variety of the techniques discussed so far
- The logic described results in the *network on the next slide*:
  - The project is started with activities A, B, and C together
  - Activity H before activity L and Activity B before activity E
  - Activity A before activity D and Activity D before activities H and I
  - Activity I before activity J and L
  - The project is completed after parallel activities L, K, and M are completed
  - Activity G before activity M while Activity F before activity G and the Finish of activity E before the start of activities H, I, and G
  - Finally Activity J before activity K and Activity C before activity F

- Start with A, B, and C together.,
  - H before L & B before E, A before D
  - D before H & I, I before J & L
  - The project is completed after parallel L, K, and M are completed
  - G before M, F before G and E before H, I, and G
  - Finally J before K and C before F



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Exercise-1: PDM (In MSPJ)

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- 'Ex-1 PDM Tasks.mpp' is a start point & 'Ex-1 PDM Solution.mpp' as it says!
  - The two Ex-1.txt files have 'cut-n-paste'-able content if you want to save on typing!
- Possible steps
  - Select *Gantt View* and enter list of tasks
    - Add links by edit to the *Predecessor* column
    - Add links by click-drag
  - Delete and change links
  - Switch to *Network Diagram View*
    - Add links by click and drag
    - Hide fields
    - Set layout to manual and explore other options
    - Define classic and or name only views
  - Switch to *Relationship View* and scroll through tasks

Exercise Solutions and Further Experimentation

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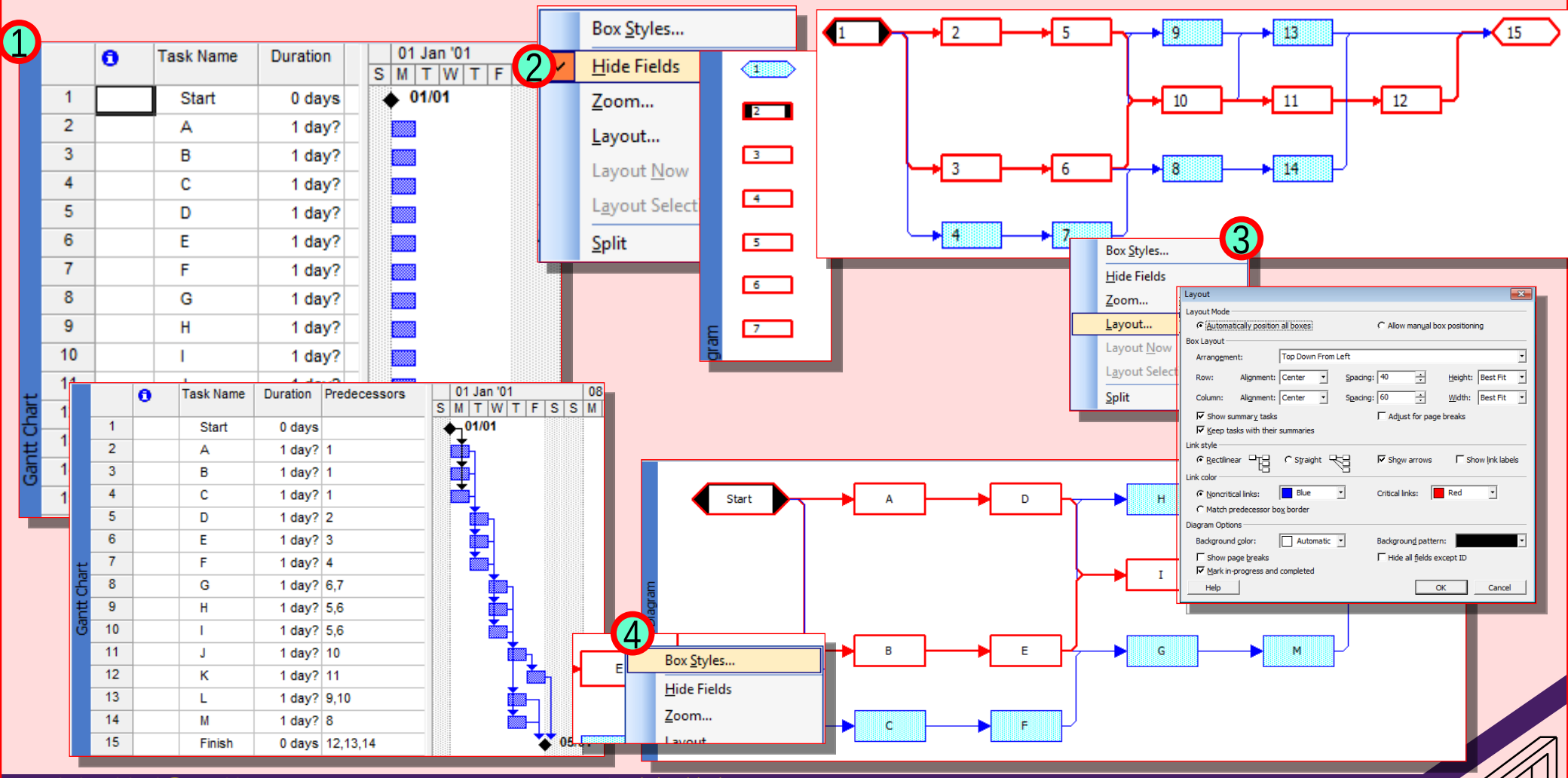

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Ex-2 (Optn): House Build Planning Packages Network

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- Imagine we have just finished a scoping workshop for a house move
  - The result is 4 planning packages
  - The next task is to document them in the planning tool

- The results are on the next slide
  - Package names have been pre-typed in-to the text file '*Ex-2 HouseBuildPlanningPackages.txt*'
    (Caution! Check task names, and sequences against next slide)
    - What differences did you find and why are they present?
  - Open the file in Notepad then cut and paste the names into MSPJ
    Later we will import data from files in other ways
    - Create the planning packages (and optionally link Planning Packages)
    - Link the work-packages
    - How many valid ways are there to model the dependencies?

Ex-2: The House Build Planning Packages

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- Preparation Planning Package
  - First purchase the land. Then we secure planning permission but after having an architect draw-up plans. In parallel with the architect's work engage the work-force: Excavator driver, cement company (for foundations), Brick-layers (walls), Carpenters, Plumbers, Roofers, Electricians and Painters
- Rough Construction PP
  - Dig the foundations then pour foundations and wait for them to set. Build all four walls in parallel, leave holes for installing windows and doors. When the walls are done install windows, doors and add the roof
- Interior Construction PP
  - When weather proof then install electrical and install plumbing services. When services are done then plaster all internal walls then paint walls and paint wood-work in parallel
- Finalisation PP
  - Remove tools, debris and unused materials then Landscape garden. Move furniture and toothbrush into house, Hold the party

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Ex-2: Build a House Manual Solution

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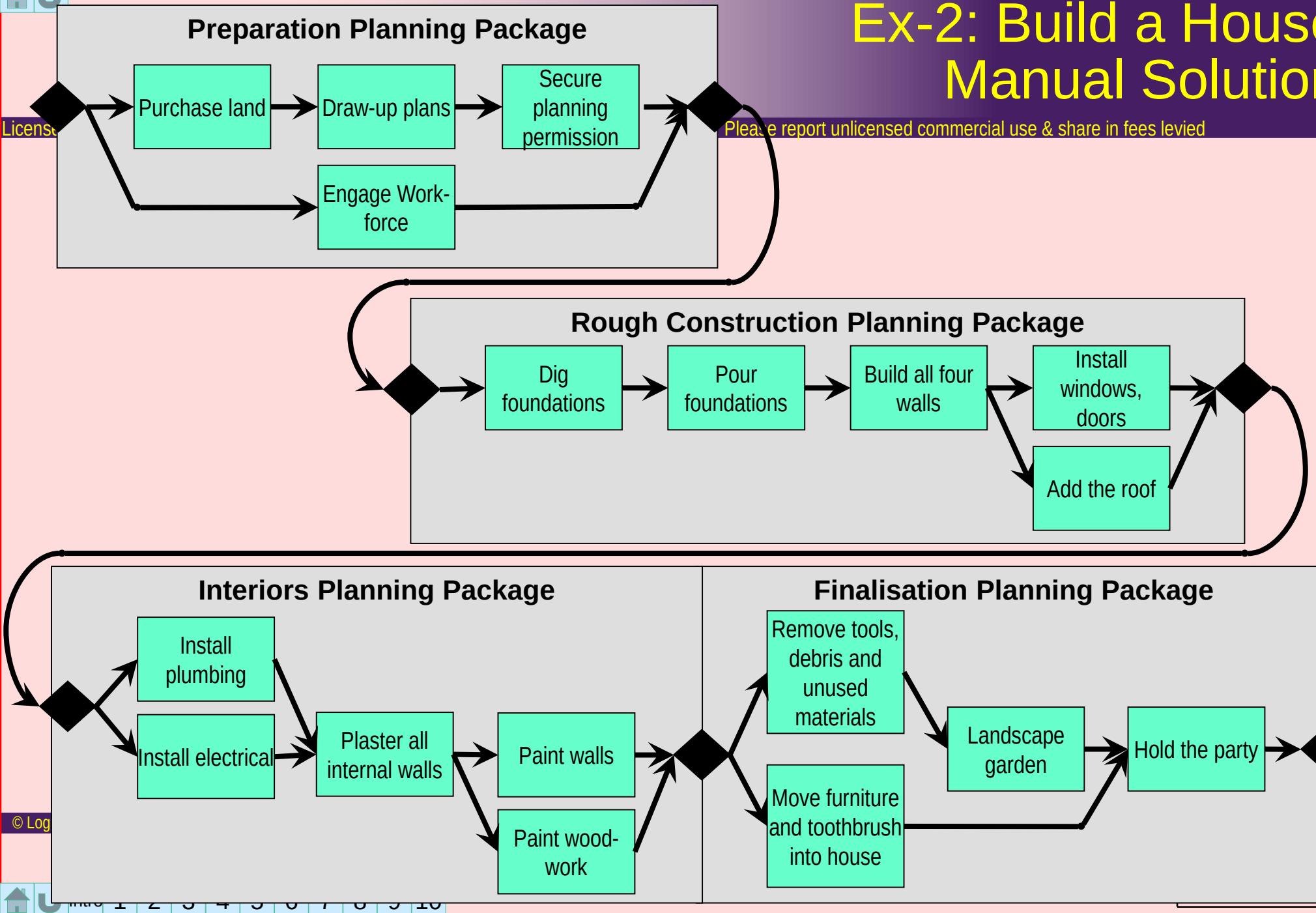

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Ex-2: Partial Answers (MSPJ)

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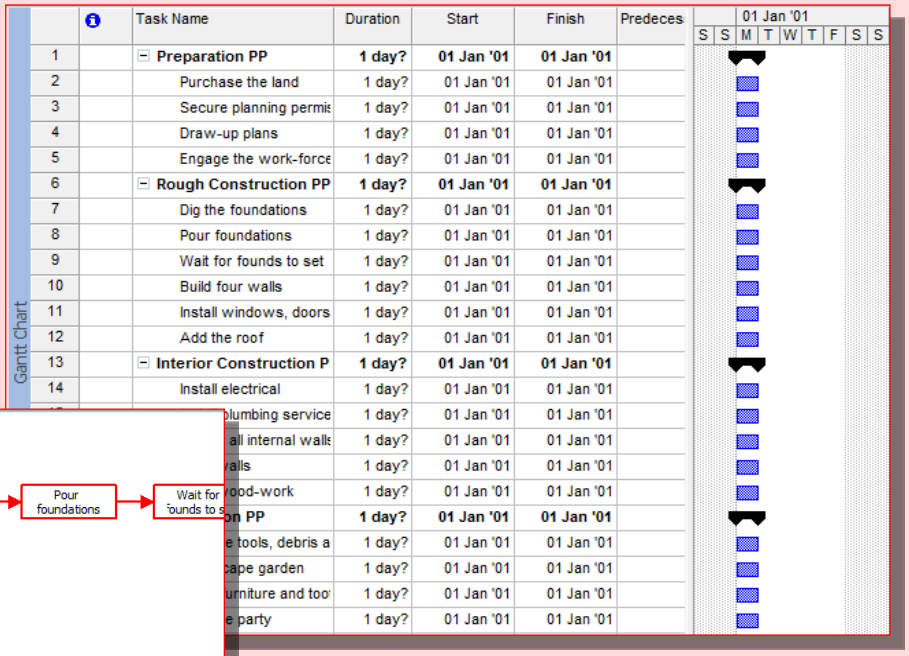
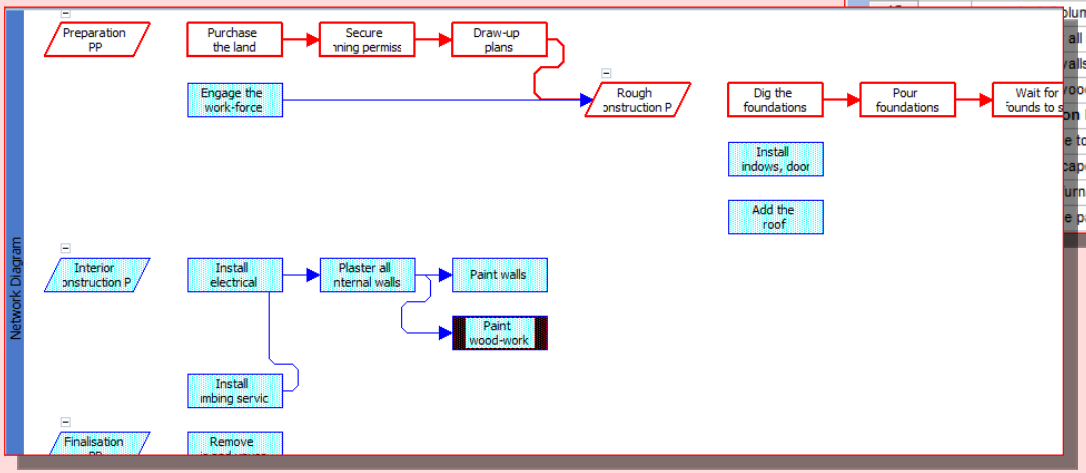
- Steps as previous exercise PLUS experiment with links between planning package
  - Try sorting tasks





Ex-2: Three Possible Final Answers (MSPJ)

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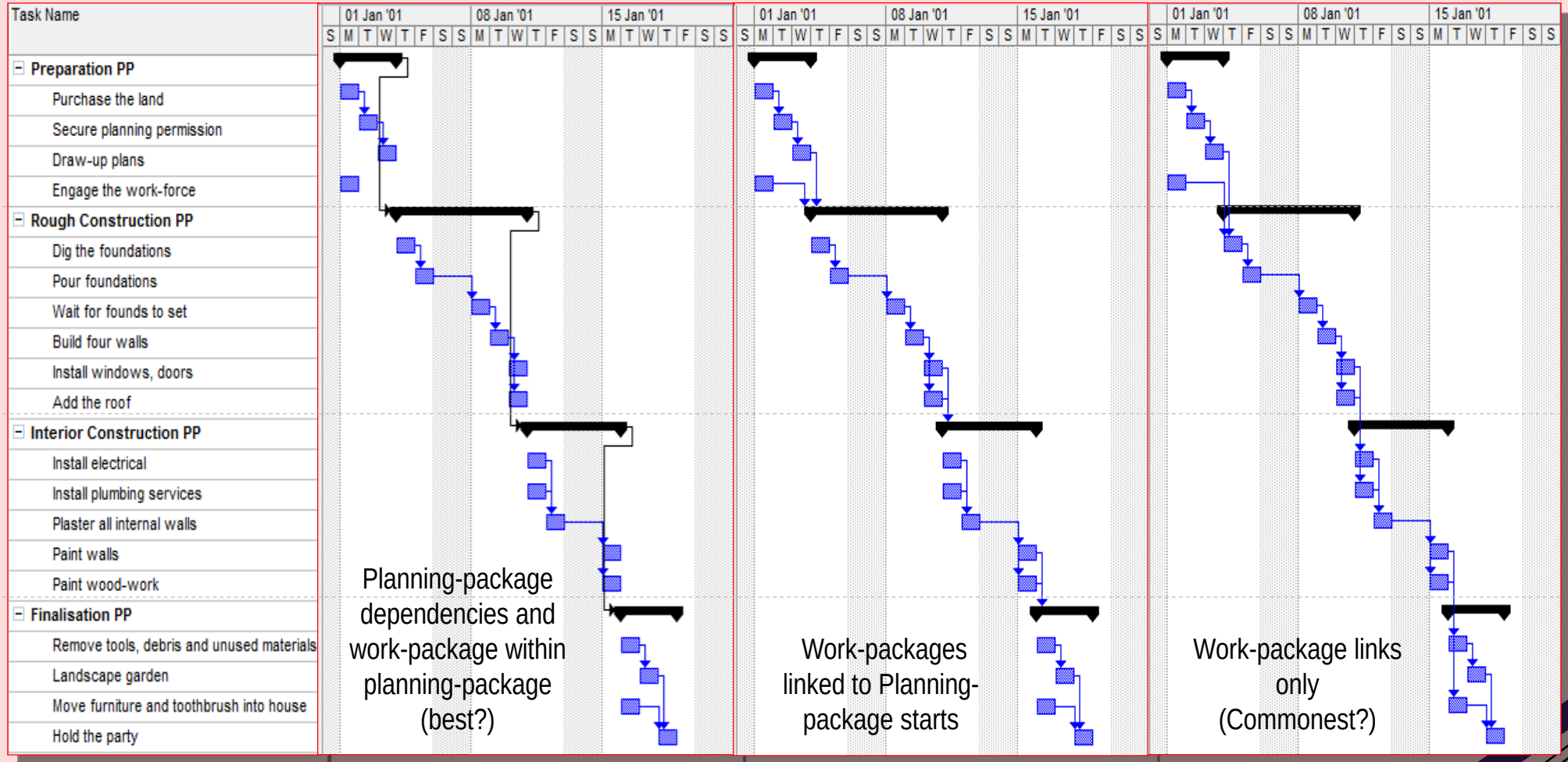

Adding Scheduling Constraints

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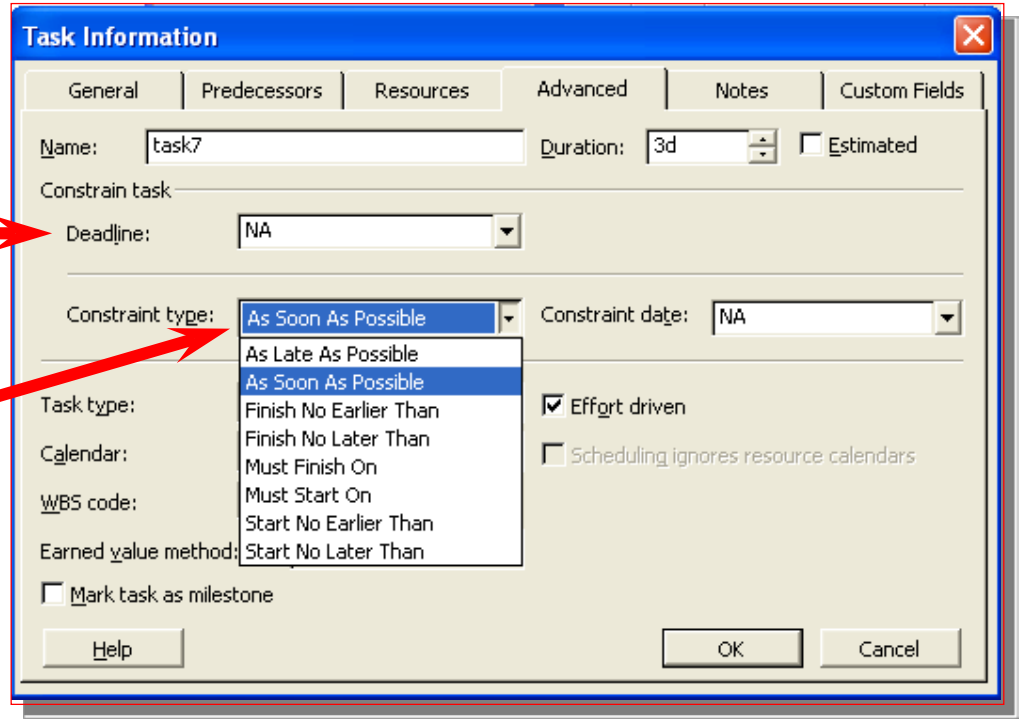
- DO NOT enter task dates
  - Use dependencies, durations and constraints
- Deadlines are just “Reminders”
  - But do restrict slack (float)
- ASAP As Soon As Possible
  - Default scheduling regime
- ALAP As Late As Possible
  - Default if project scheduled from the end-date
  - Tasks may have date constraints EG from the contract
  - {Start or Finish} NO {Earlier or Later} THAN
  - MUST {Start or Finish} ON



Setting and Checking Constraints

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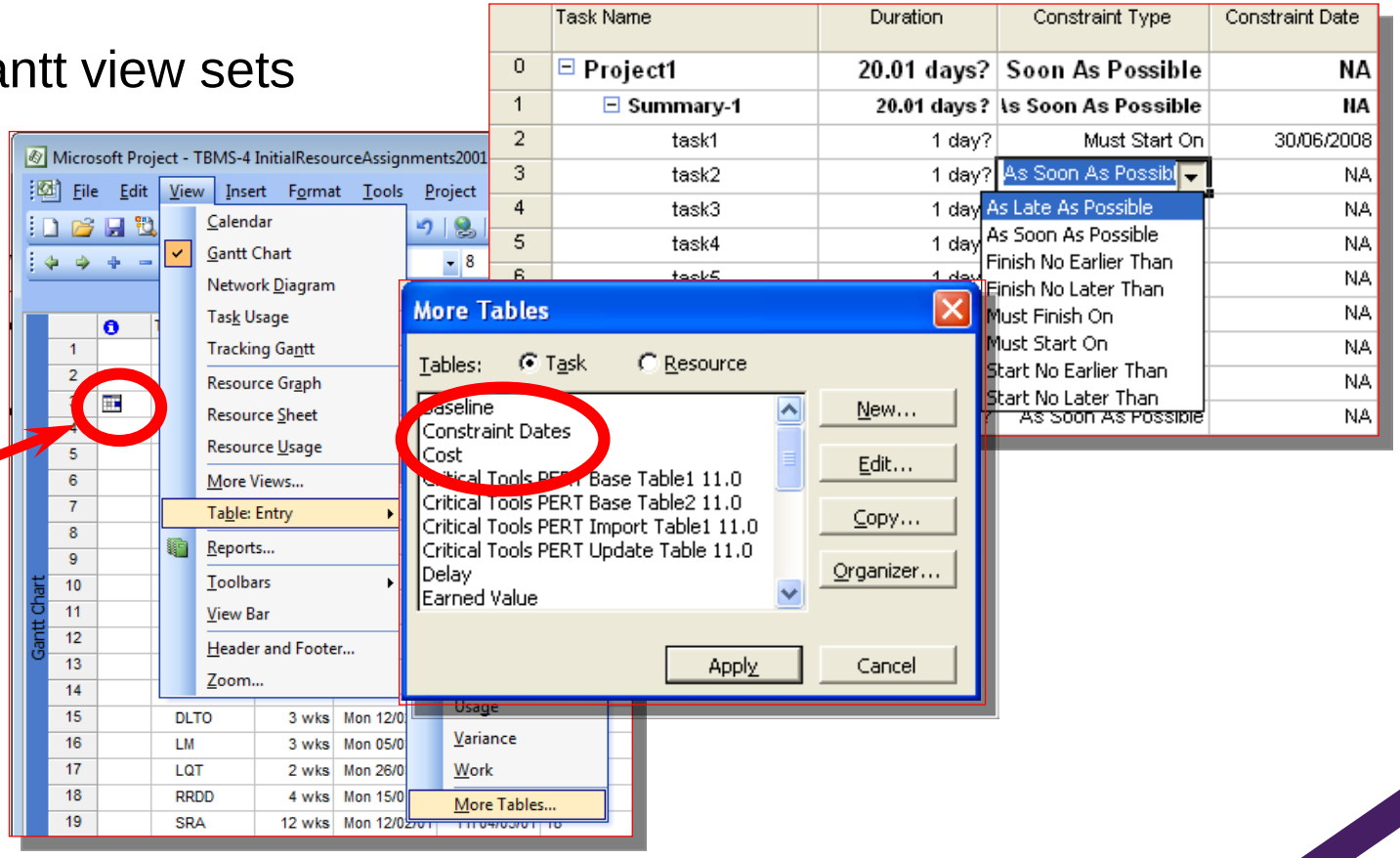
- '*Constraint Dates*' view allows review and adjustment of all constraints
- Dragging a task in Gantt view sets constraints
  - Generally a bad idea
  - Detectable via the Note icon



Reviewing Individual Task Constraints

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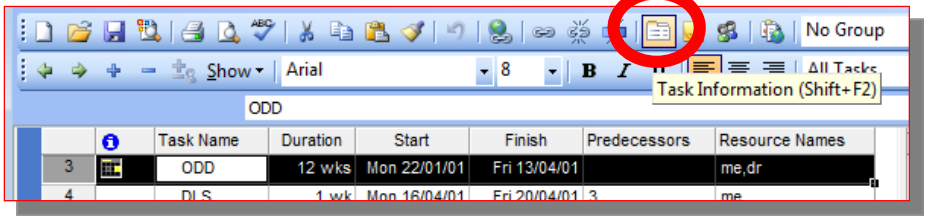
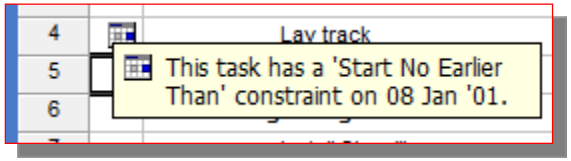
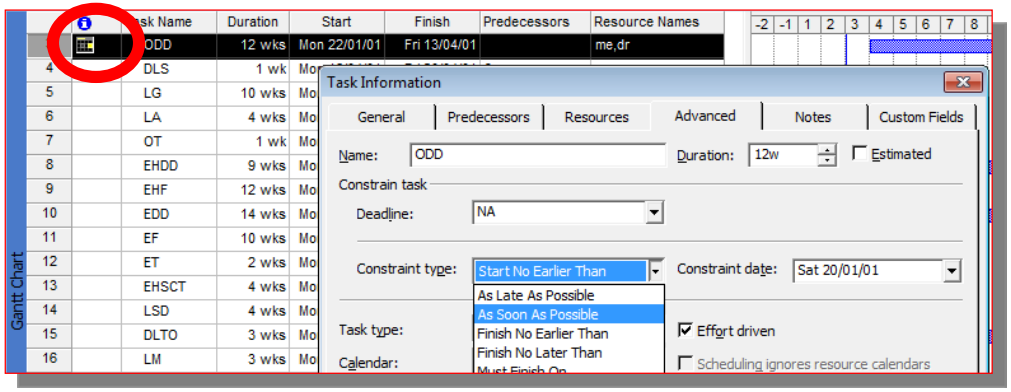
- Per task
  - The '*Task Information*' dialogue allows inspection and amendment of key facts



  - Generally it is best to set any dragged task dates back to ASAP





  - Then add 'appropriate' task definition to achieve schedule required

Entering More Of A Task's Details with Task Entry View

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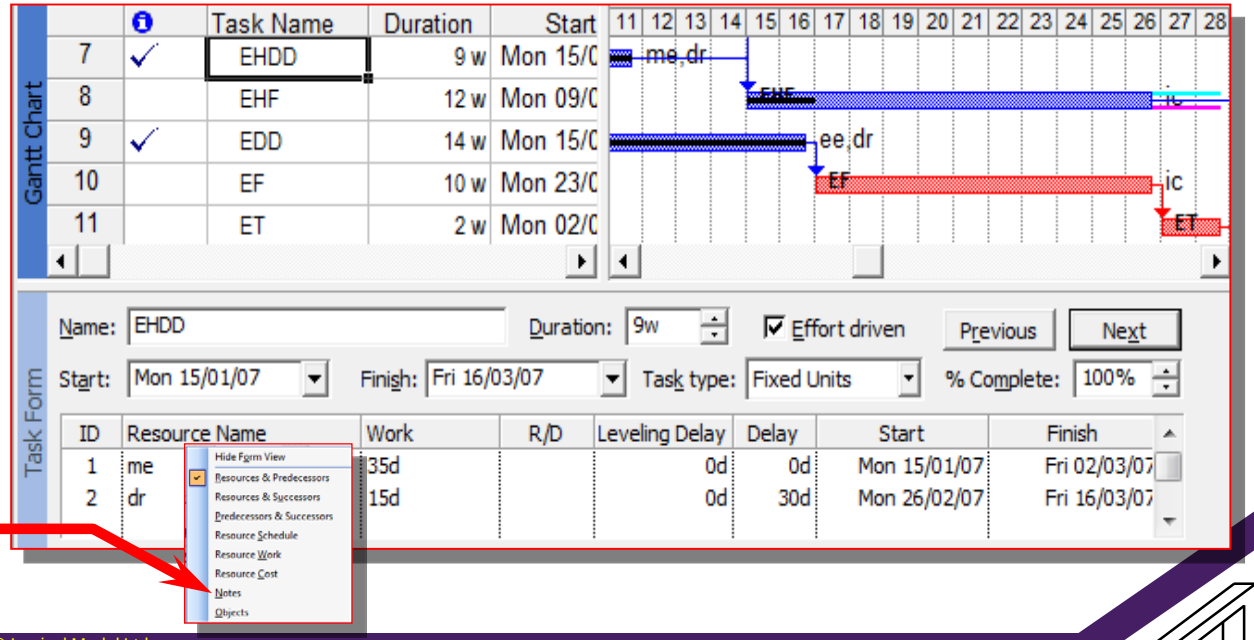
- The *Task-Entry-View* is a split screen view (*View | More Views | Task-Entry*)
  - Upper ½ is further split into 'Task-Entry-Table' and Gantt-Graph
  - Lower ½ shows "*Task Form*" for the task selected in the upper ½
    - *Right-Click* to change
    - Forms cannot be edited (new ones can be created using *Tools | Customise | Forms* or VBA*)
- Task Form omits many useful items
  - EG *Physical %Complete*
  - EG *Constraints*
- Lower pane's choice of forms available by background Right-Click



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*VBA = Visual basic for Applications. Accessed via Alt+F11

Entering Task And Time Quantities 1/2

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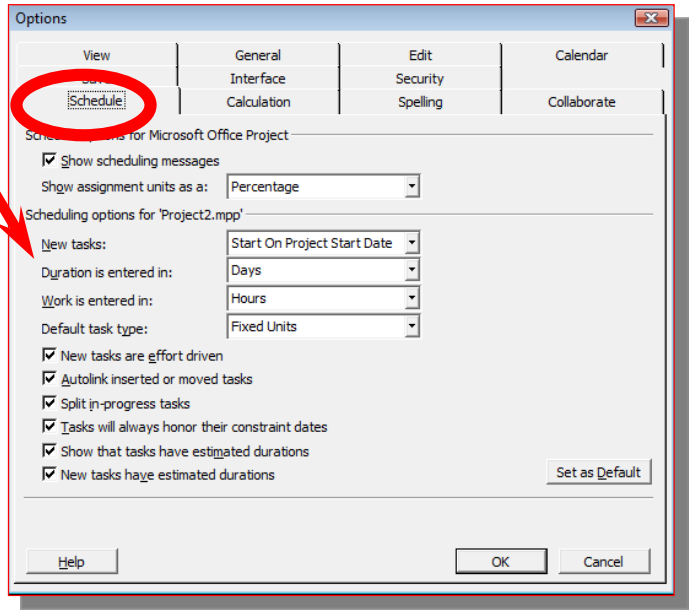
- Tasks have a *duration* and a *work* content
  - By default *Duration* is entered in Days and *Work* in Hours
    - Duration of “1” (no unit) = 1d
    - Work of “1” = 1hr
    - Unit can be specified when entered (“1w” = A week)
  - Durations are project working days duration (wdd)
    - EG 3 days from Friday morning is end of day Tuesday (assuming a European calendar)
  - Unless explicitly noted as ‘edays’ (elapsed)



Entering Task Time Quantities 2/2

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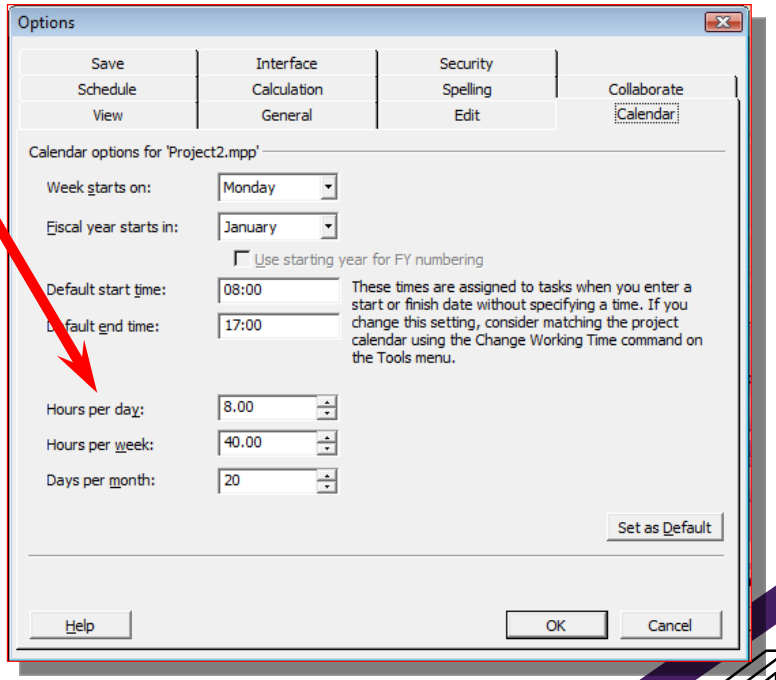
- Durations are converted to or calculated from work-hours on initial assignment
  - Based on number of resources, Standard Day's length and task attributes

- Internally *Work* is manipulated in hours
  - Work is **converted** on entry to "work-hours" at rate in *Tools | Options | Calendar-Tab | Hours Per {Day, Week, Month}*
  - Then scheduled based on calendars
    - EG assuming defaults a 5 day task becomes 40hrs work scheduled from 08:00 to 17:00 over the next five MTWThF days



Conventions For Entering Task Durations And Work

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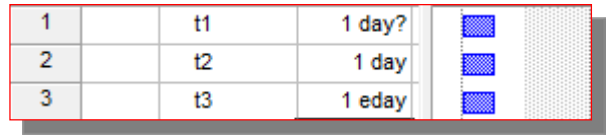
- A task's *Duration* and or *Work* can be entered as
  - Minutes (m or min), Hours (h, hr, hours), Day (d or dy), Weeks (w or wk), Months (mo, or mon)
  - Displayed as set by *Tools | Options | Edit-tab | View Options for Time Units*
  - Default if no unit specified is *Tools | Options | Schedule-tab | Duration is Entered in*
- When entering duration…
  - "?" shows a duration is 'estimated'
  - "e" shows a duration is elapsed
  - Include units and "?" if desired EG "1wk?" "1ewk?"
  - Or drag the right hand side of a task
  - By default MSPJ calculates (Start-Date + Duration = Finish-Date)
    - "Schedule from Finish Date" subtracts duration from Finish-Date
    - Dates are displayed as set by *Tools | Options | View | Date Format**



1		t1	1 day?	
2		t2	1 day	
3		t3	1 eday	

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*Network diagrams allow overriding of the default date format on a cell by cell basis

Effort Driven, Fixed Duration, Units or Work

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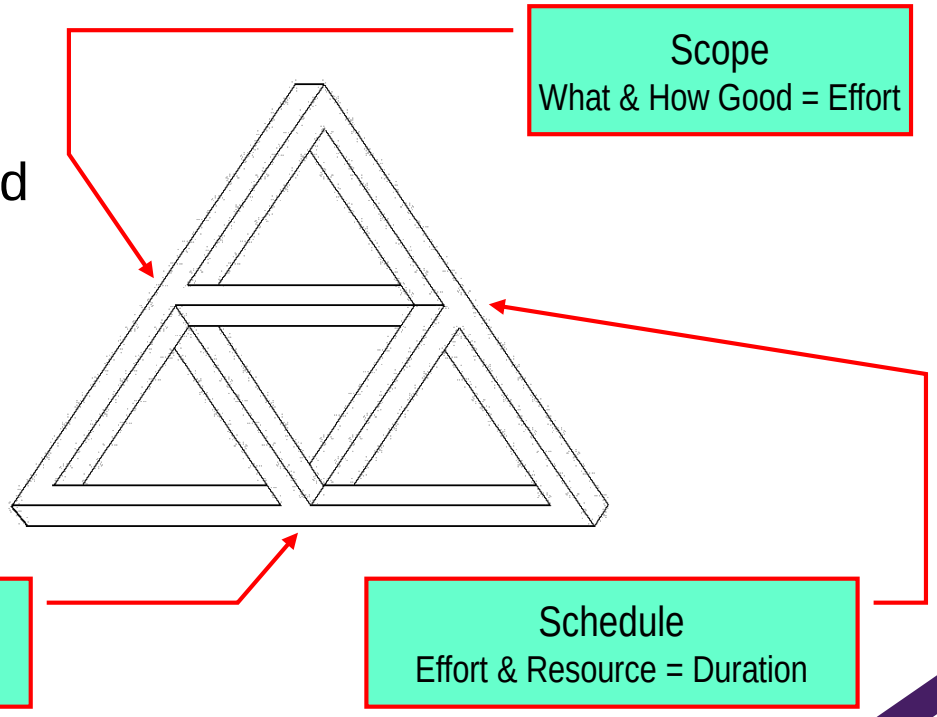
- Task entry includes describing the link between duration, resources and work
  - Not all task's durations change with amount of resource assigned
    - Tasks whose duration is linked to resources are 'Effort-Drive' aka Fixed-Work
  - MSPJ maintains a triangular relationship AFTER work-load, duration and resources are specified
    - Change to one factor causes recalculation of one of the other factors
    - Which factor is amended is based on Task-Type



One or Two Elements Fixed; Third Variable

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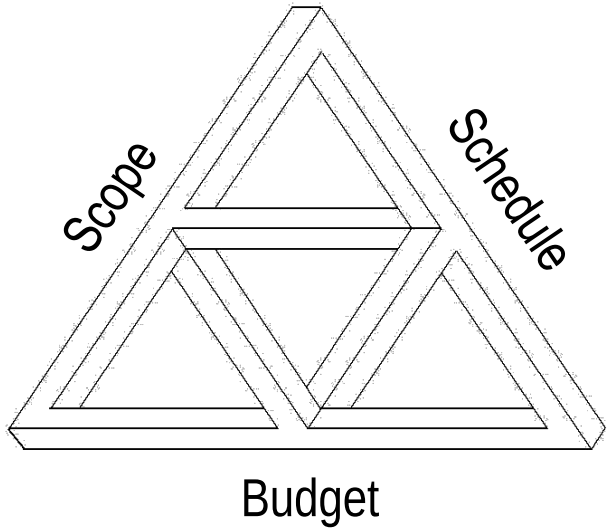
- Fixed-Work (Effort-Driven) means
  - "If Duration is changed recalculate resource and vice-versa to keep effort (work) constant"

- Non-Fixed-Work is either
  - Keep resource constant (Fixed Units) or
  - Keep duration constant (Fixed-Duration)



- MSPJ default is Fixed-Units, Effort-Driven (More later)

Entering Task Costs

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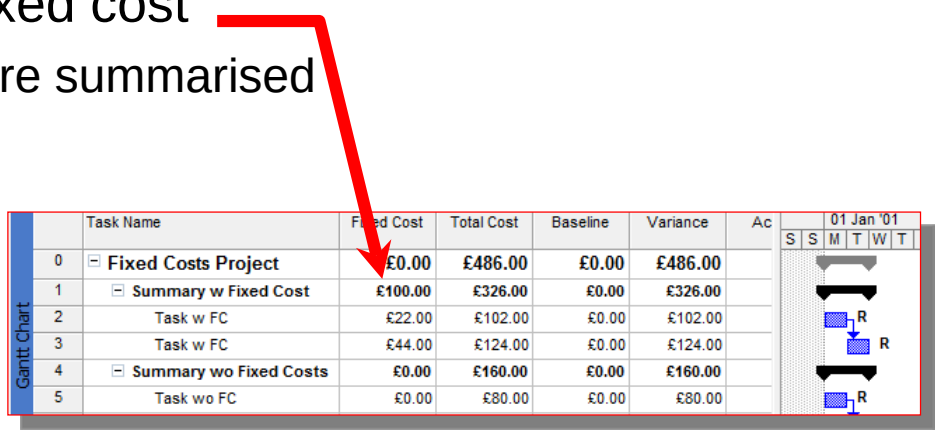
- A task's Variable Costs are calculated from resources assigned
  - Costs of 'Work resource' = Units * Duration * Rate per unit per duration
  - Material resource costs = Volume * Rate per unit of volume
- Tasks, Summary tasks and the project as a whole can have 'own' fixed costs
  - Not related to resource assignment
  - Summary tasks record their own fixed cost
    - Only lower level resource details are summarised
- Labour and material costs are calculated from resource usage (more later)



Summary

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- After the task-list is defined task attributes are entered
  - Key attributes to capture are dependencies (and work required)
  - Creation of the network starts and ends with milestones
    - Milestones included at other key coordination points
- Dependencies can be created by linking in the *Gantt* & *Network view*
  - Entered into table cells or click and drag
  - MSPJ understands FS, SS, SF, and FF and Lag and Lead
    - Does not draw 'correct' graphical representations
  - Scheduling constraints added intentionally via *Task Information* (and unintentionally by dragging)
  - *Relationship* and *Constraint Views* may be useful to quality check a schedule
- MSPJ maintains a relationship between Duration, Units of Resource and Work
- Time to practice: Case study – Define the project up-to network diagram

Case Study: Network Diagram

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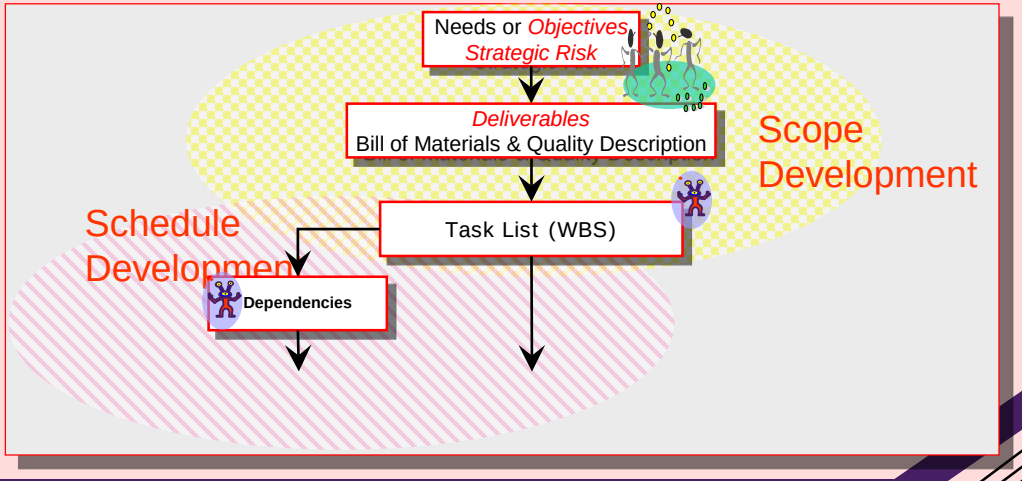
- Some weeks ago your company was approached to build a precision imaging system
  - An initial workshop session with the customer and your Engineers has just concluded the creation of PBS and WBS

- Step 1: Load and link the tasks of the case-study to form the network
  - Work-packages have been pre-typed into ‘Case Info.txt’ for you!

- The complete set of tasks and dependencies is included in the next few slides



Case-Study: Network Diagram Instructions For Step-1

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- Using the information provided do the following:
  - Record in MSPJ the sequence and logical relationships of all project activities defined in the indented-list format WBS and activity list
  - Record task inter-dependencies from the technical insights after the WBS
- The initial work-shop's outputs have provided the following insights
  - There are four subassemblies in the product which are mostly independent parallel work-streams plus the Image Buffer XSO assembly and then final assembly, test, and in-field calibration
  - Tasks listed within sub-assembly are in the order of planned accomplishment
  - There are a few inter-subsystem dependencies noted on following slides
  - There are few final activities for assembling and testing the whole system
  - They are also listed in the order of planned accomplishment

Short Name	Sub-system	Full Name
LIS	Lunar Imaging System	
S		Start-MS
OutD		Outline Design
	Optics Sub-System	
OD		Optics Design
LSPs		Lens System Parameters
LensFab		Lens Fabrication
OA		Optics Assembly
OT		Optics Test
	Focusing Mechanics Ss	
FMD		Focusing Mechanics Design
FMP		Focusing Mechanics (Purchase)
	Electronics Ss	
ED		Electronics Design
EFab		Electronics Fabrication
ET		Electronics Test
ESI		ElectroServo Preparation for Integration
	Laser RangeFinder Ss	
LRST		Laser Ranging System Tender
LGP		Laser Generator (Purchase)
LasFab		Laser Fabrication
LPI		Laser Preparation for Integration
	Image Buffer XSO	
ISD		Image Storage Design
ISFab		Image Store Fabrication
ISABD		Image Store As-Built Drawings
XA		XSO Assembly
XR		XSO Review
	Intg'tn & Proving Phase	
ASS		Assemble Sub-Systems
LISST		System Test
LISAT		Accept Test
FIC		Field Installation & Calibration
F		Finish-MS

Case Study: Network Diagram Cont.

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- The tasks have been entered for you in 'Case Info.txt' and 'Case-1 TaskList.mpp'
  - Use either or type the tasks names!
- Establish the dependencies described by the SME's
  - Dependencies are also 'cut-n-paste'-able from 'Case Info.txt'
  - You may have to try a couple of times to understand the alignment –experiment ☺
- Recall work in sub-systems is more or less sequential
- Use or omit summary tasks as you prefer

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Case Study: Network Diagram SME's Documented Dependencies

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- You have been able to obtain from the various departments the inter-work-stream information needed to complete the initial logic diagram:
  - T-2* Outline Design activity (OutD) must complete before any other activities can begin. When OutD is complete Optics Ss, Focusing Ss, Electronics Ss, Laser Ranging Ss and Image Buffer XSO work-streams can all start
  - T-4 'Optics Design (OD)' and T-10 Focus Mechanics Design (FMD) must be complete before T-11 'Focusing Mechanics (Purchase) (FMP)' can start
  - T-11 FMP and T-15 Electronics Test (ET) must both be completed before T-16 Electro Servo Preparation for Integration (ESI) work-package can start
  - T-29 Overall sub-system Assembly (ASS) task cannot start until T-8 Optics Test (OT), T-16 ESI, & T-21 Laser Preparation for Integration (LPI) complete
  - T-27 XSO Sub-System review (XR) activity and T-30 System Test (ST) must both completed before T-31 LIS Acceptance Test (LISAT) can start

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*Task numbers assume the use of sub-tasks

Case-Study: Network Diagram Start-Point and Solution

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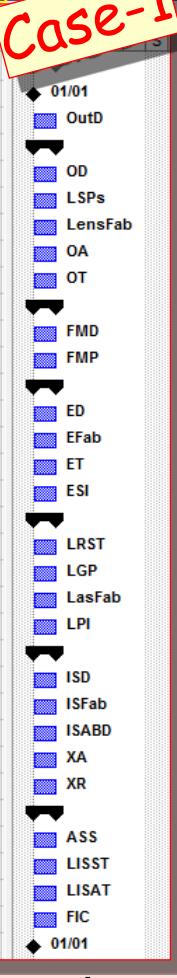
Case-1

	Task Name	Task Short Name
0	**Lunar Imaging System**	**LIS**
1	Start-MS	S
2	Outline Design	OutD
3	**Optics Sub-System**	
4	Optics Design	OD
5	Lens System Parameters	LSPs
6	Lens Fabrication	LensFab
7	Optics Assembly	OA
8	Optics Test	OT
9	**Focusing Mechanics Ss**	
10	Focusing Mechanics Design	FMD
11	Focusing Mechanics (Purchase)	FMP
12	**Electronics Ss**	
13	Electronics Design	ED
14	Electronics Fabrication	EFab
15	Electronics Test	ET
16	ElectroServo Preparation for Integration	ESI
17	**Laser RangeFinder Ss**	
18	Laser Ranging System Tender	LRST
19	Laser Generator (Purchase)	LGP
20	Laser Fabrication	LasFab
21	Laser Preparation for Integration	LPI
22	**Image Buffer XSO**	
23	Image Storage Design	ISD
24	Image Store Fabrication	ISFab
25	Image Store As-Built Drawings	ISABD
26	XSO Assembly	XA
27	XSO Review	XR
28	**Intg'tn & Proving Phase**	
29	Assemble Sub-Systems	ASS
30	System Test	LISST
31	Accept Test	LISAT
32	Field Installation & Calibration	FIC
33	Finish-MS	F

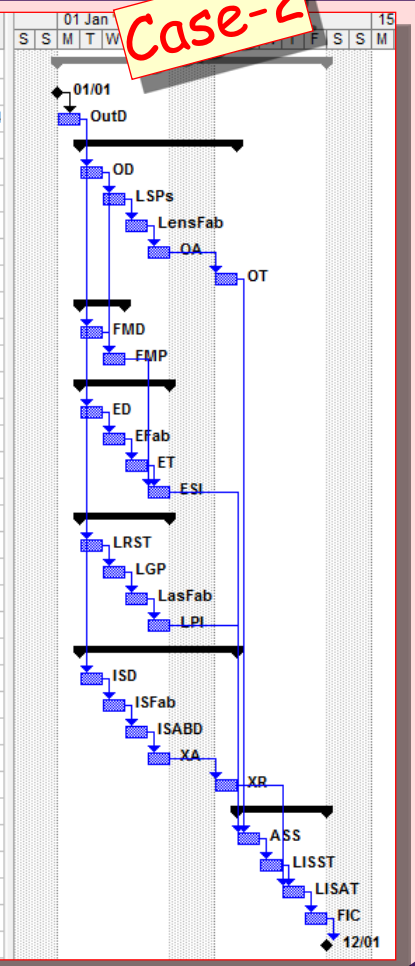
Gantt Chart



Case-2

	Task Name	Pred'csr	Successors
0	**Lunar Imaging System**		
1	Start-MS		2
2	Outline Design	1	10,13,18,23,4
3	**Optics Sub-System**		
4	Optics Design	2	5,11
5	Lens System Parameters	4	6
6	Lens Fabrication	5	7
7	Optics Assembly	6	8
8	Optics Test	7	29
9	**Focusing Mechanics Ss**		
10	Focusing Mechanics Design	2	11
11	Focusing Mechanics (Purchase)	4,10	16
12	**Electronics Ss**		
13	Electronics Design	2	14
14	Electronics Fabrication	13	15
15	Electronics Test	14	16
16	ElectroServo Preparation for Integ	11,15	29
17	**Laser RangeFinder Ss**		
18	Laser Ranging System Tender	2	19
19	Laser Generator (Purchase)	18	20
20	Laser Fabrication	19	21
21	Laser Preparation for Integration	20	29
22	**Image Buffer XSO**		
23	Image Storage Design	2	24
24	Image Store Fabrication	23	25
25	Image Store As-Built Drawings	24	26
26	XSO Assembly	25	27
27	XSO Review	26	31
28	**Intg'tn & Proving Phase**		
29	Assemble Sub-Systems	8,16,21	30
30	System Test	29	31
31	Accept Test	30,27	32
32	Field Installation & Calibration	31	33
33	Finish-MS	32	

Gantt Chart



- Case-1 is the Start point and Case-2 the end of this case-study segment

Additional Ex: Model Scope From A Client Brief

This is in-fact an old PRINCE2® exam question! But it is also an excellent example of how to turn a brief into a product set before adding the verbs that define the project's scope of work PRINCE2® is a trademark of the OGC in the UK and other countries and they demand recognition

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Use the text below to create a PBS, WBS and network diagram then set-up the project in MSPJ

Your client, a local council has realized that their current Social Services Information Systems (SSIS) will not cope with new legislation. They have one year to be compliant or may *then* face fines. A **new system** is proposed. It will also automatically **collate data** that currently requires 3 staff to do manually.

Up to now the different departments have held their own **records** on small computers, offering basic facilities. Duplications and omissions are a big problem. This has led to many costly mistakes in payments. These records will have to be **corrected** by Social Workers *before* **transfer**ring to the new system *after* it is **installed**. The old and **new programs** use the same **database software**, so no major conversion work will be needed.

A **contract** will be placed with an external supplier for **hardware** and **software** to replace all the current small computers with one powerful machine, which offers many extra facilities plus operating economies. The supplier is already part way through the **design of a system**, based on specifications agreed with two other councils. The **purchase order** will be **signed** *as soon as* the Project Initiation Document is approved. The supplier also uses PRINCE2.

Five computer operators and **seven other SSIS** staff will need training in the new hardware and software. There will *then* be further significant work by SSIS staff to **prepare the new system** for operational use.

The supplier, in the tender, has offered to make **small adjustments** at no cost at certain points in the new software to fit in with **local practices**. From the supplier's point of view these *will have to be* carefully monitored in order to stay within a very tight timescale and budget if the supplier is to make a profit. The Council must **specify these changes** *within* three months of the contract being signed.

© **Two hundred Social Services** staff *will need to be trained* to use the new software

Additional Ex: Social Services Scenario

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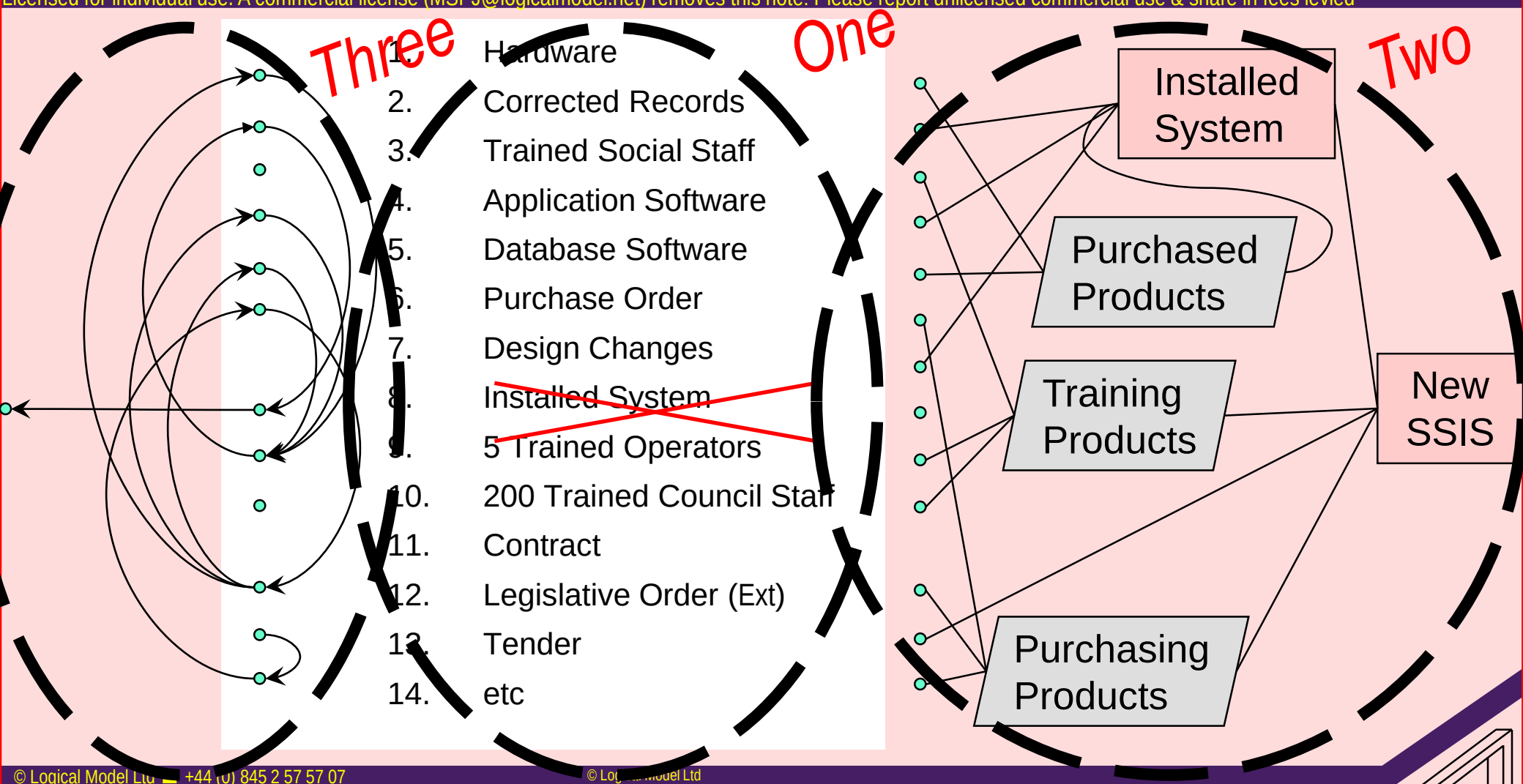

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This worked example omits several definite products in order to reduce complexity of the illustration

Additional Ex: PBS Result

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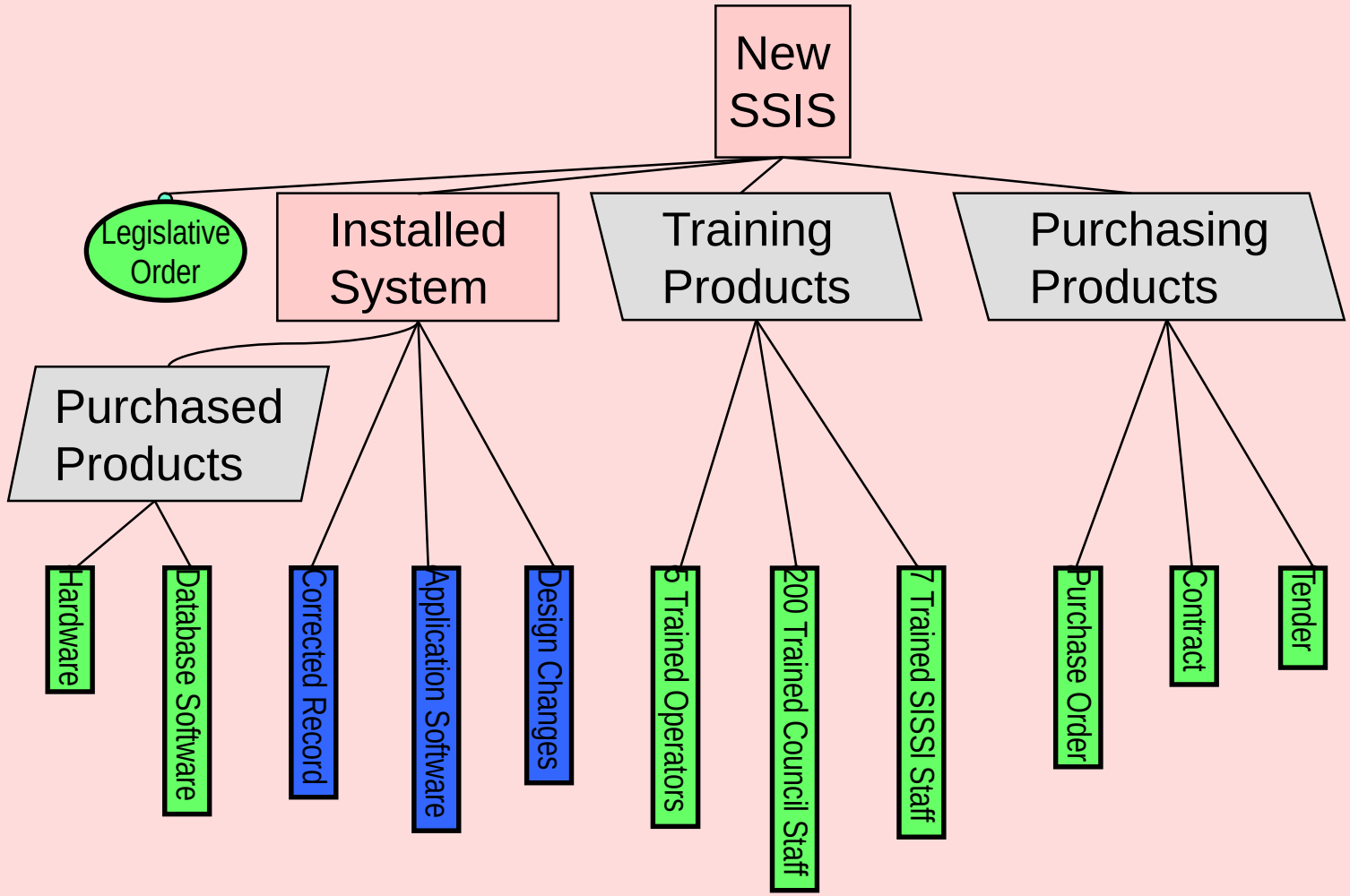

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Additional Ex: Product Dependencies

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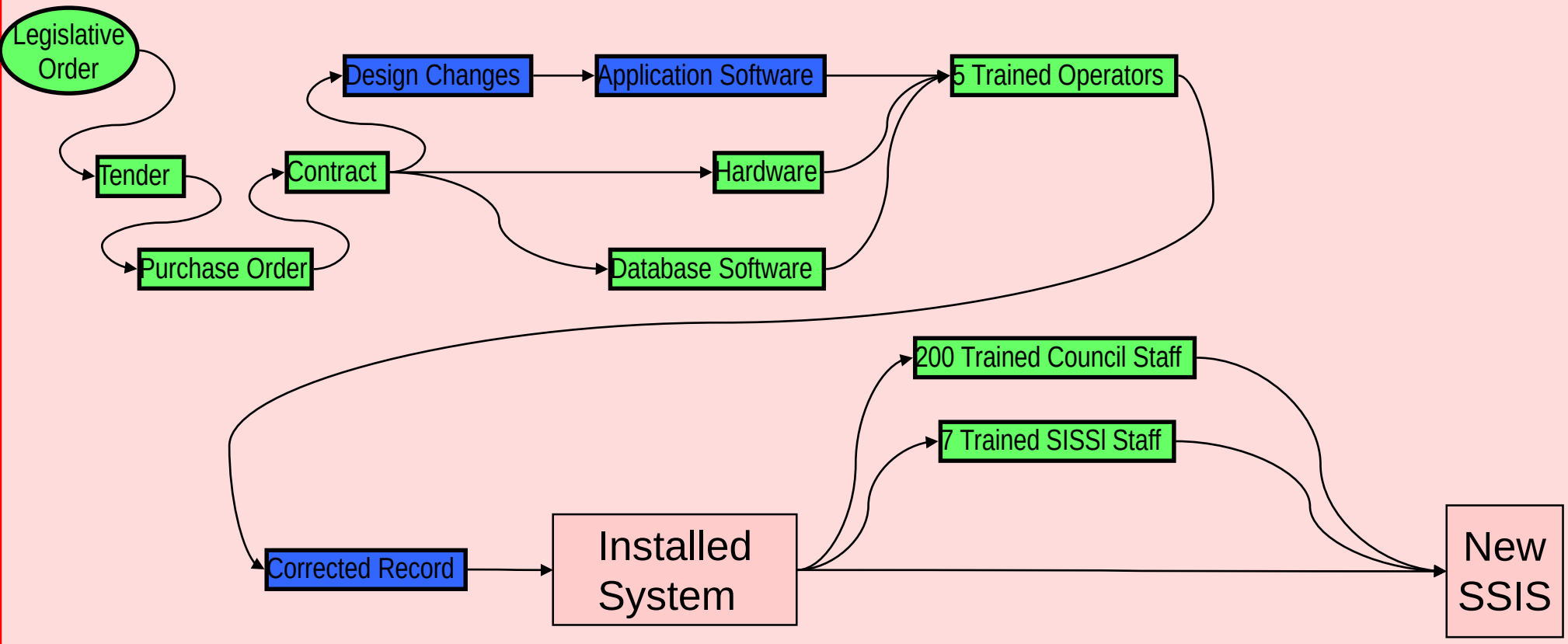

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Additional Ex: MSPJ Solution

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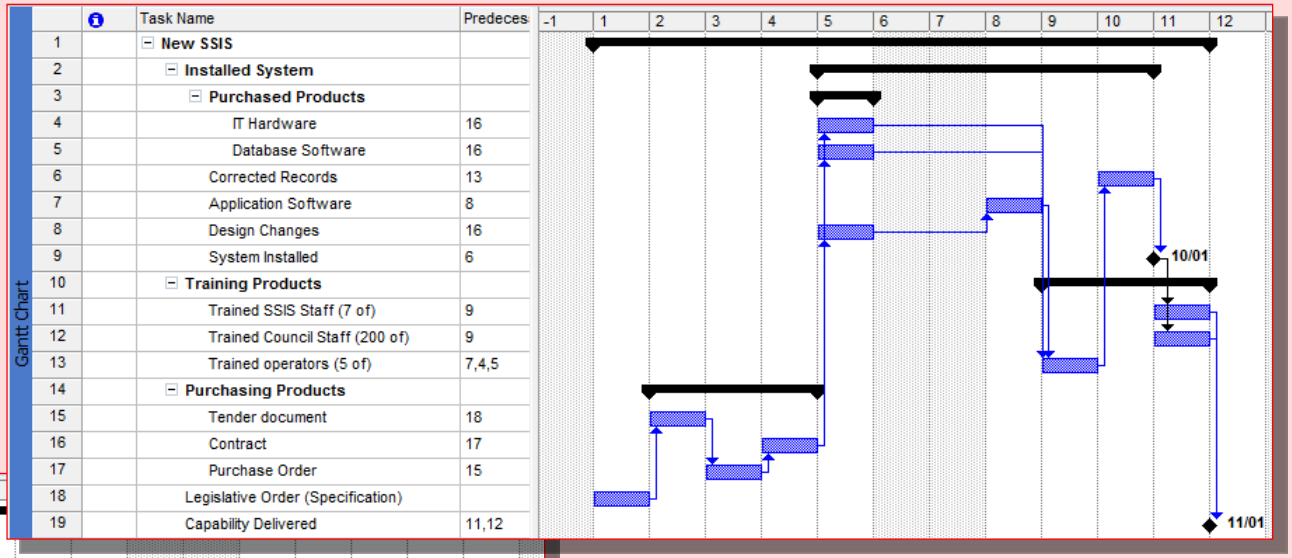
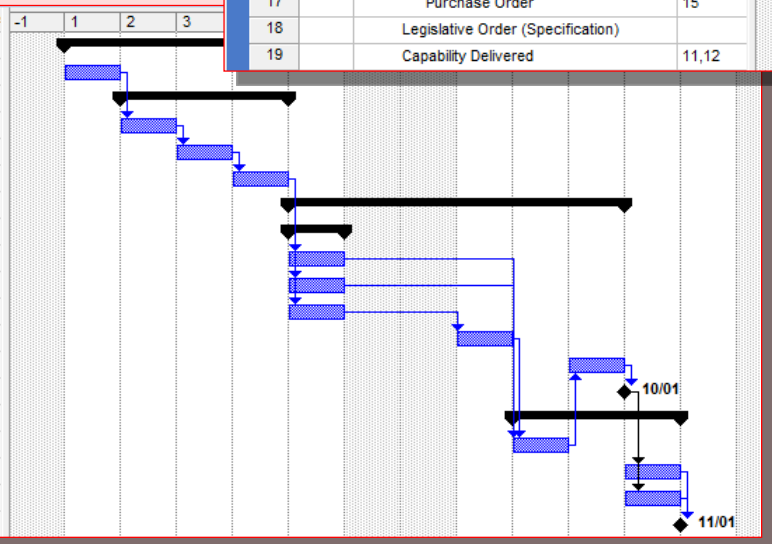
- First make initial entry of products
- Second link into use-order
- Third sort by start date
- Fourth add verbs in the product's life-span

	Task Name	Predeces
1	**New SSIS**	
2	**Installed System**	
3	**Purchased Products**	
4	IT Hardware	16
5	Database Software	16
6	Corrected Records	13
7	Application Software	8
8	Design Changes	16
9	System Installed	6
10	**Training Products**	
11	Trained SSIS Staff (7 of)	9
12	Trained Council Staff (200 of)	9
13	Trained operators (5 of)	7,4,5
14	**Purchasing Products**	
15	Tender document	18
16	Contract	17
17	Purchase Order	15
18	Legislative Order (Specification)	
19	Capability Delivered	11,12



	Task Name	Predeces
1	**New SSIS**	
18	Legislative Order (Specification)	
14	**Purchasing Products**	
15	Tender document	18
17	Purchase Order	15
16	Contract	17
2	**Installed System**	
3	**Purchased Products**	
4	IT Hardware	16
5	Database Software	16
8	Design Changes	16
7	Application Software	8
6	Corrected Records	13
9	System Installed	6
10	**Training Products**	
13	Trained operators (5 of)	7,4,5
11	Trained SSIS Staff (7 of)	9
12	Trained Council Staff (200 of)	9
19	Capability Delivered	11,12



The only reason for a project is to change business-as-usual for your organisation or your customer's

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- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 5

Lesson 5: Entering Resources and Assigning Resources To Tasks

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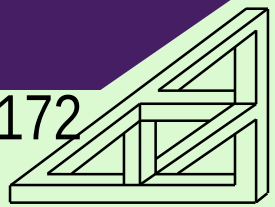

Objectives

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- Appreciate where we are in the schedule development process
- Enter resource information and create or link-to a resource pool
  - An aside: Importing data from other format files
- Assign resources to tasks over time: - Time-phased assignments
  - Initial assignments & initial scheduling plus the effect of calendars
  - Using a hierarchy of Breakdown Structures and RAMs
  - The mechanics of Task-Type. Much more on this tricky topic (and more later)
    - Assign resource to task with or without pre-estimated work
    - See that changing elements of assignments changes other elements
    - Use the Task and Resource Usage views
    - Establish how to avoid issues with MSPJs scheduling logic
  - Experiment with the triangular relationships within assignments
- Practice with the case study

Development and Maintenance of Project Baseline

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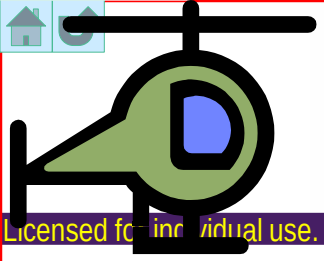

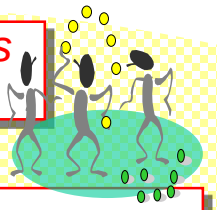

Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

Monitoring, Tracking & Control

The Schedule Development Process 1/2

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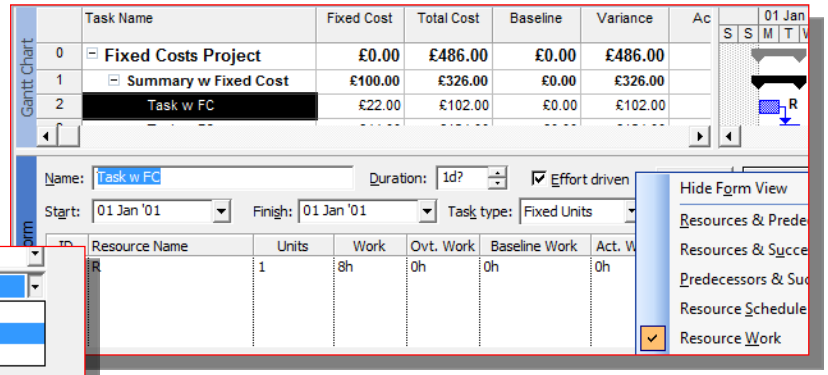
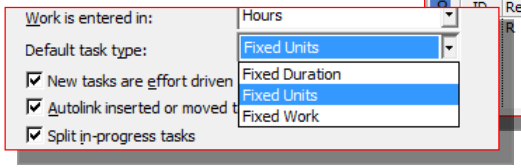
- First or Second: Enter details of tasks
  - Task's name and inter-dependencies
  - Set *Task-Type* and *Effort-Driven* indicator (or allow to default*)
  - Enter estimated work
    - *Work* field is not included in default task-entry table
    - MSPJ assumption in Tables, Help texts and mind-set is we enter *Durations* ☹
- First or Second: Enter details of resources
- Third: Make initial assignments of resources to tasks
  - People and materials
  - MSPJ will multiple & or divide work, duration & people using initial entry rules
  - MSPJ's calculation of time-phased assignments normally needs correction
    - If you wish to track and use Earned Value with precision





* The default default (sic) is Fixed Units & Effort Driven. Default can be set in *Tools | Options | Schedule | Default Task Type*

The Schedule Development Process 2/2

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- Then
  - Determine required resource profile, calculate cash-flow, budget and schedule
  - Adjust dependencies and resourcing to fit constrains of cost and time
    - Resolve resource overloads and inefficiencies by changing assignments
    - MSPJ will multiple and or divide work, duration and people on change using Task-Type and Effort-Driven rules
    - MSPJ's re-determination of duration, assignments and work normally still needs correction
  - Repeat the above until Risk, Scope, Budget, Resource & Urgency are in balance
  - Advise people of baseline
    - Integrated mechanisms include MS Outlook, Project Server or MSPJ Web access

Contents: Resource Pools

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- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
- Task-Usage and Assignment Sheets
- Summary
- Case-Study

Resource Pools

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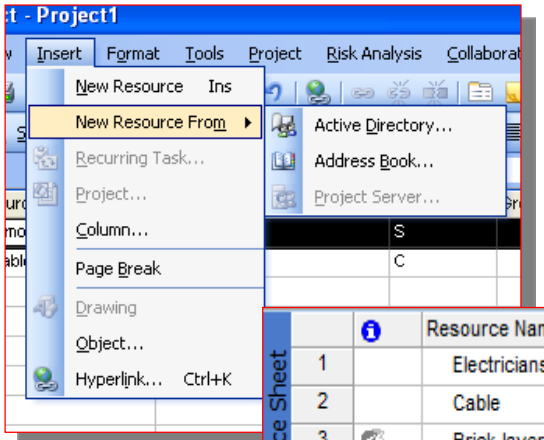
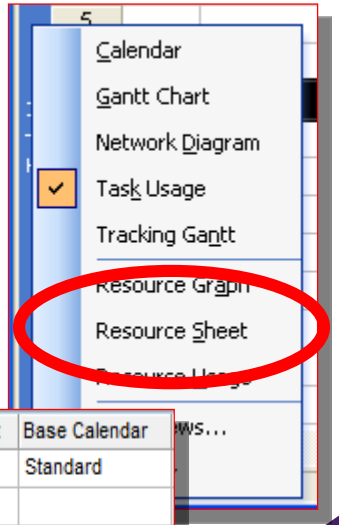
- Resource assignments are drawn from a “resource pool”
  - Pool may be defined in the project’s file or a dedicated resource pool file
  - People, equipment and materials resources defined in same pool
  - People and equipment are “work-resources” – effort is measured in time
  - Materials are consumable – measured by “*Material label*” quantity
  - Resource pools can be company-wide (MSPJ-Server version)



- Adding by hand uses the “Resource-Sheet”
  - *View | Resource-Sheet*
- Resource lists can be imported from MS Exchange directories, Excel or text files



Resource Sheet

		Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1		Electricians	Work		Sparks	Trade	100%	£28.00/hr	£32.00/hr	£0.00	Prorated	Standard
2		Cable	Material	Meters	cable	Consum		£0.66		£0.00	Prorated	
3		Brick-layer	Work		Brickie		800%	£30.80/hr	£0.00/hr	£0.00	Prorated	Standard
4		Bricks	Material	Pallet	Brick	Consum		£450.00		£0.00	Start	

Entering the Resource Pool Information

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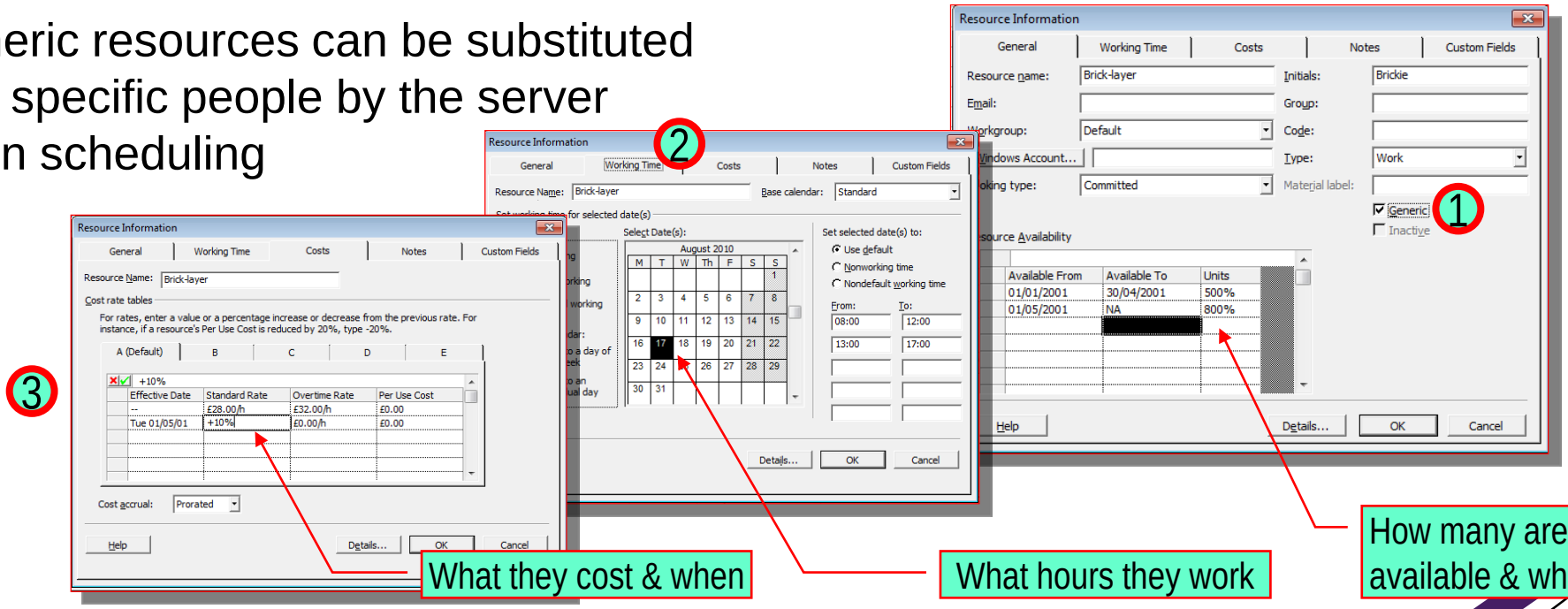
- Resources are typed (or imported or cut-n-pasted) into a Resource Sheet

		Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1		Electricians	Work		Sparks	Trade	1	£28.00/hr	£32.00/hr	£0.00	Prorated	Standard
2		Cable	Material	Meters	cable	Consum		£0.66		£0.00	Prorated	
1		Brick-layer	Work		Brickie		800%	£30.80/hr	£0.00/hr	£0.00	Prorated	Standard

  - Use the *Resource Information* dialogue to enter details

- Generic resources can be substituted with specific people by the server when scheduling



Entering Resource Costs: Simple Method

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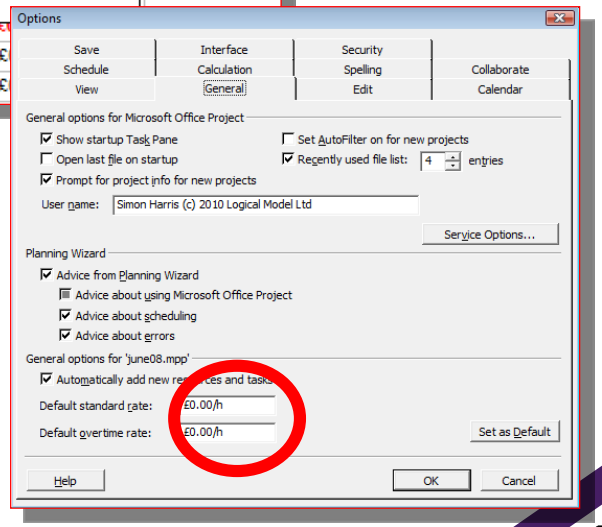
- Select *View | Resource Sheet* and table *Entry* (Or *Resource Information | Cost-tab*)
  - Resources may have a per-use-cost and a per unit of time/ material cost

Resource Sheet

	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1	Electricians	Work		E		3	£35.00/hr	£44.00/hr	£0.00	End	Standard
2	Cables	Material	Meters	Cable			£0.67		£0.00	Prorated	
3	JCB-Back-Hoe	Work		J		1	£0.00/hr	£0.00/hr	£1,000.00	Prorated	Standard
4	Bricklayers	Work		BL		1	£25.00/hr	£40.00/hr			Standard
5	Bricks	Material	Pallets	Brick			£450.00				
6	StdResource	Work		S		1	£0.00/hr	£0.00/hr			
7	16HrDayRes	Work		1		1	£0.00/hr	£0.00/hr			
8	4dWeek	Work		4		1	£0.00/hr	£0.00/hr			

Start
Prorated
End



- Default rates are set in *Tools | Options | General*
  - Default accruals *Tools | Options | Calculation*
  - Currency display *Tools | Options | View | Currency options*

Resource Cost: Full Capabilities

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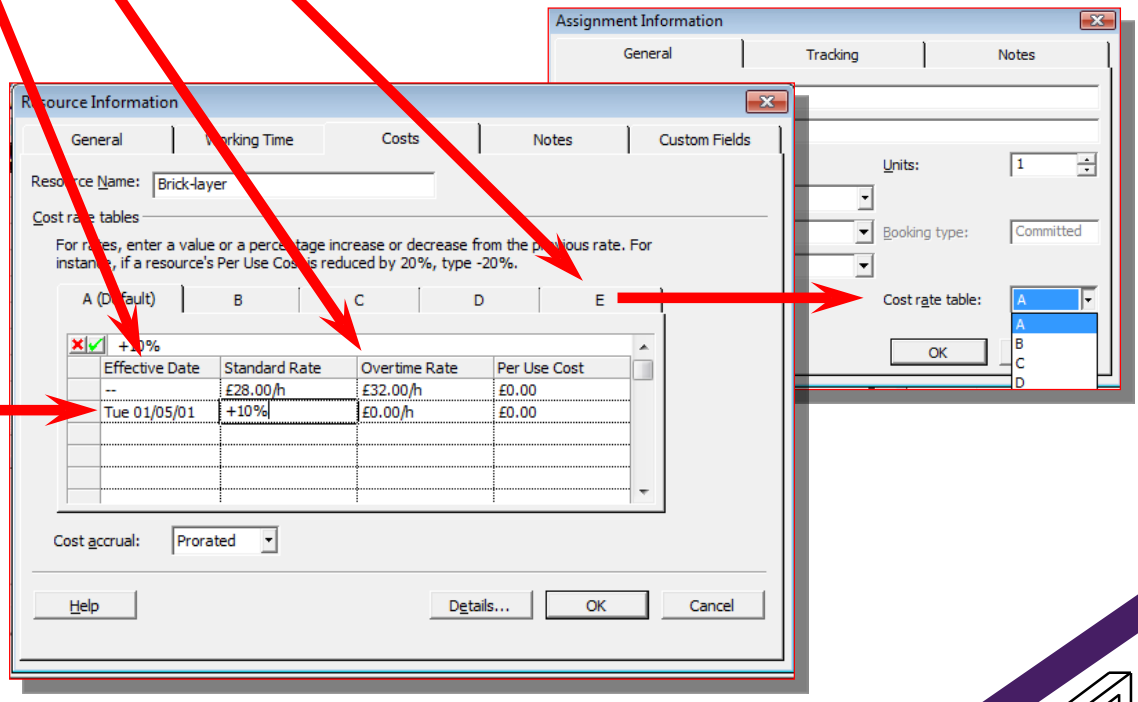
- A resource's costs can be linked to:
  - Job-type
  - Overtime rate
  - Scheduled date
- Rate changes can be entered as percentages



Resource Availability and Calendars

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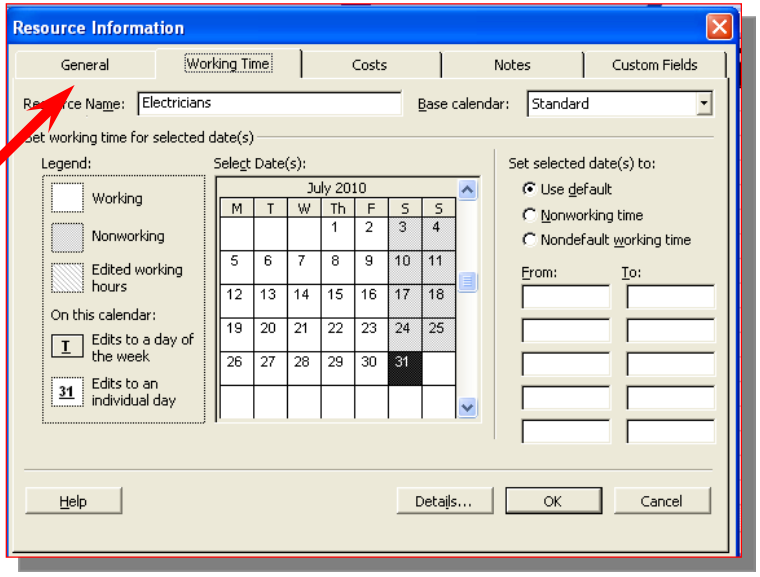
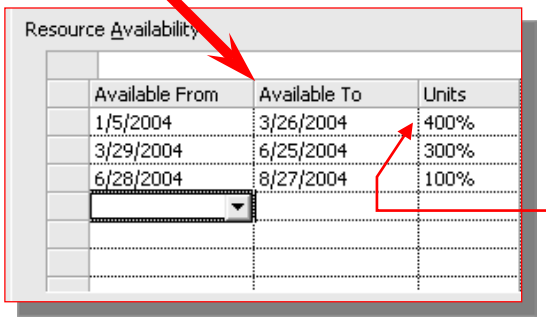
- Max-Units available is a percentage of the resource's calendar hours
  - Default is 08:00 →12:00, 13:00→17:00 (an 8hr day working day)
- EG if the resource calendar defines a resource as M&T 0900→1500 then they have 12hrs per week available at 100% capacity
  - Generic resources may be available >100% IE you have multiple people or machines
  - Availability dates and rates can be set from the *General-Tab*
  - Standard calendar can be amended or a new base-calendar created & assigned *(Tools | Change Working Time | New)*





Tools | Options | Schedule-Tab | Assignment Units As {Decimal, Percentage }

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Resource Outline Codes

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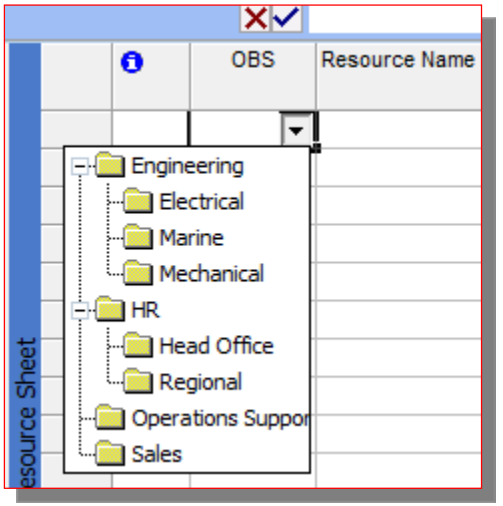
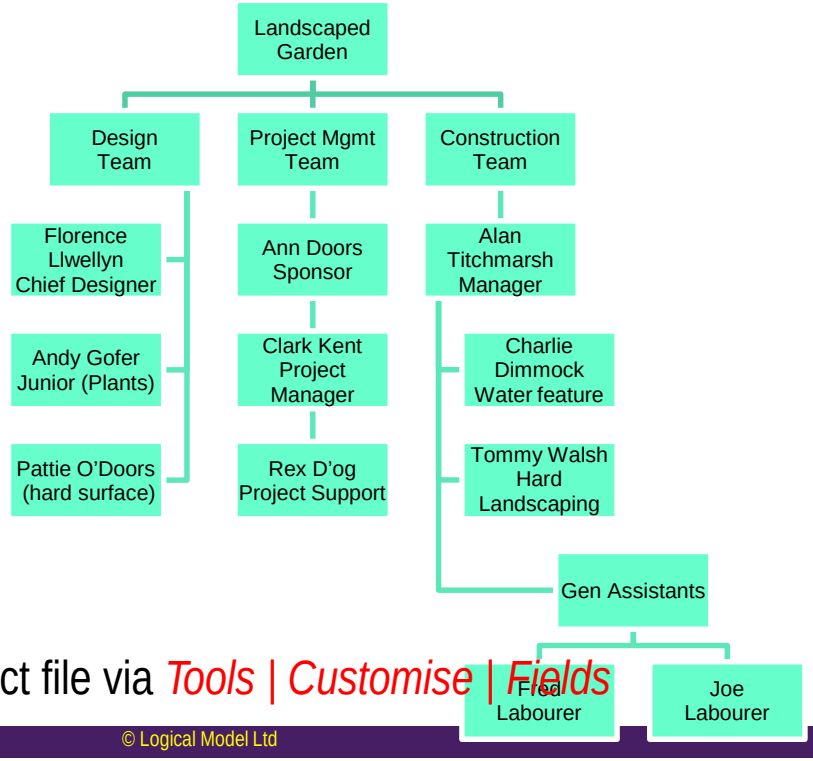
- Resources, like tasks, can use custom outline codes
  - *Tools | Customise | Fields | Custom Outline Codes*
  - Outline code reflects the project's OBS (Organisational Breakdown Structure)





- Import existing codes from a project file via *Tools | Customise | Fields*

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Linking To A Shared Resource Pool

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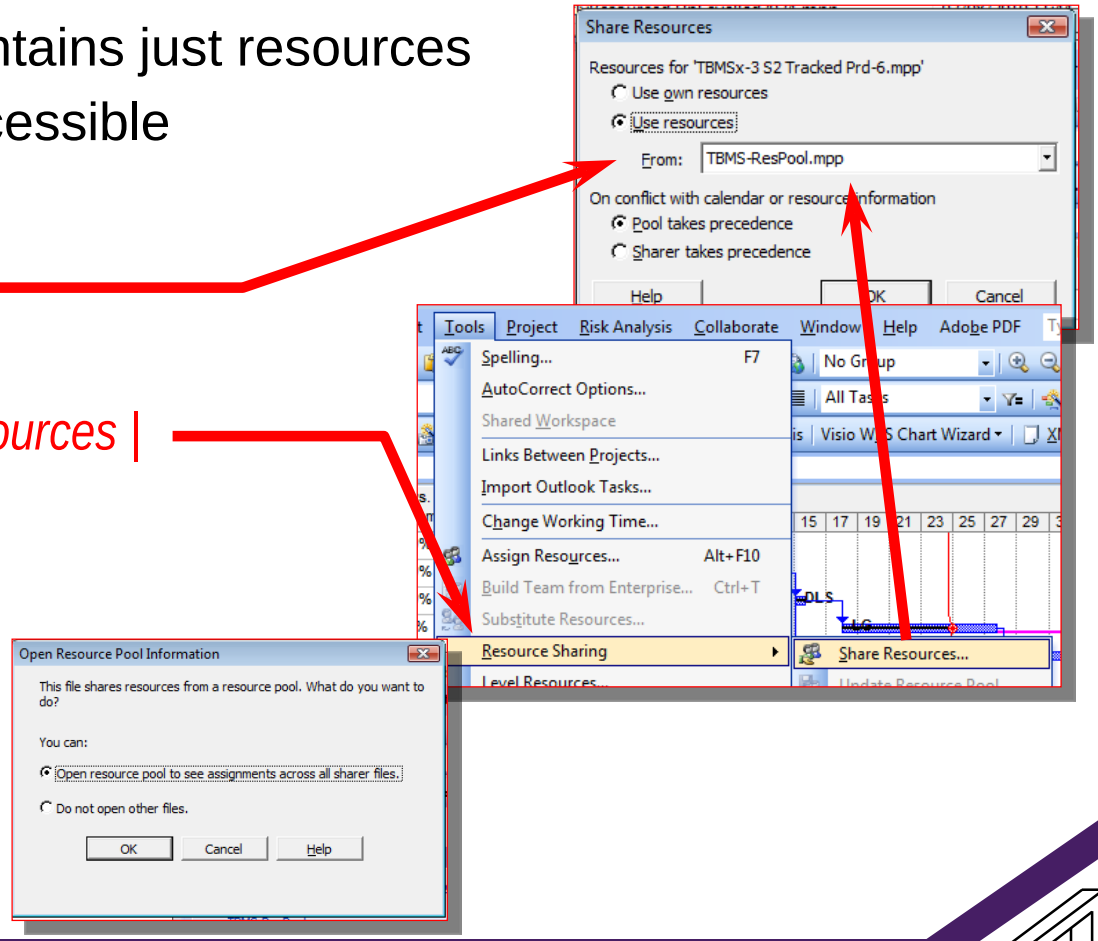
- The simplest resource definition is created with the tasks in the project file
- Typically a linked resource pool contains just resources
  - Saved somewhere centrally accessible
- To use a resource pool
  - Open the resource pool
  - Open (create) a *sharer* project
  - *Tools | Resource Sharing | Share Resources | From: |'filename.mpp'*
  - Also set the conflict response (*pool takes precedence* is best)
- Next time the sharer is opened a prompt to open the resource pool is issued



Importing Details EG Resources

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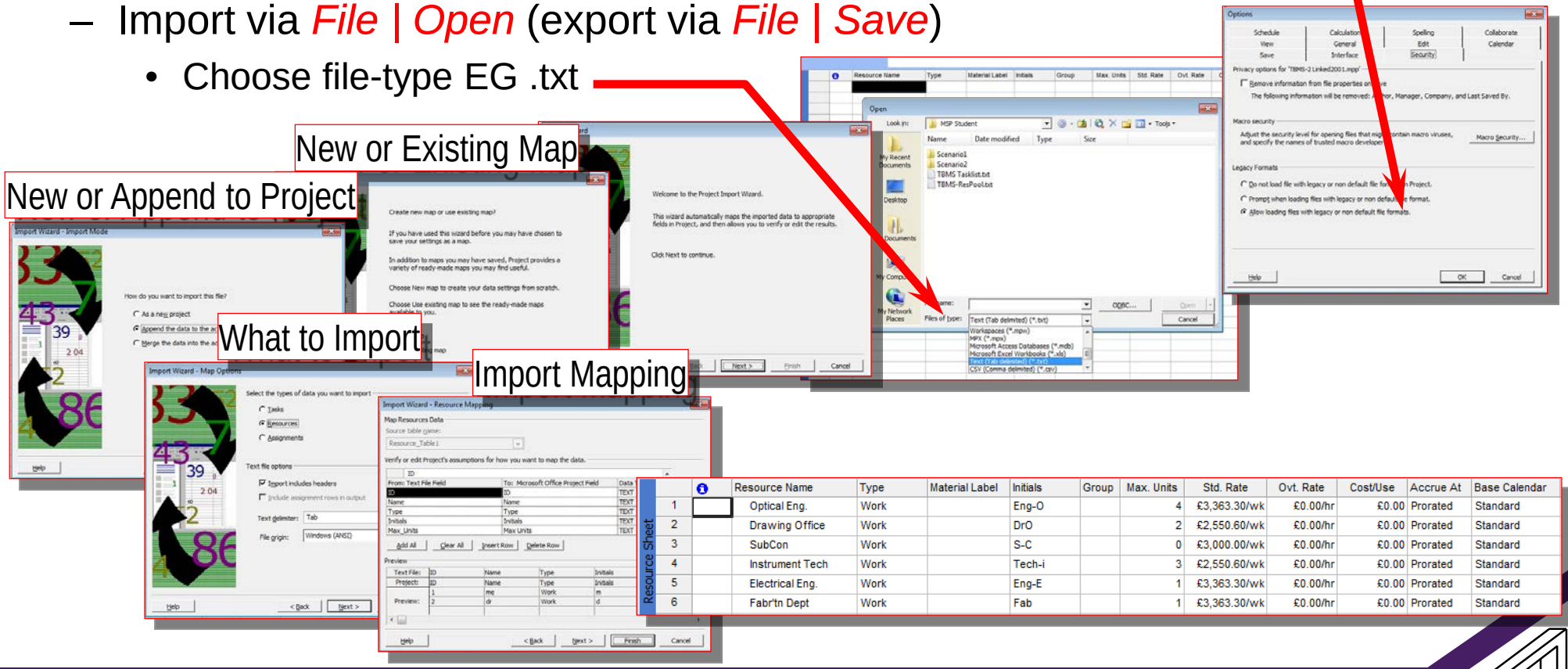
- Resource (task and assignment) data can be imported (and exported)
  - First set security level *Tools | Options | Security-tab | Allow loading files…*
  - Import via *File | Open* (export via *File | Save*)
    - Choose file-type EG .txt



Resource Sheet

	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1	Optical Eng.	Work		Eng-O		4	£3,363.30/wk	£0.00/hr	£0.00	Prorated	Standard
2	Drawing Office	Work		DrO		2	£2,550.60/wk	£0.00/hr	£0.00	Prorated	Standard
3	SubCon	Work		S-C		0	£3,000.00/wk	£0.00/hr	£0.00	Prorated	Standard
4	Instrument Tech	Work		Tech-i		3	£2,550.60/wk	£0.00/hr	£0.00	Prorated	Standard
5	Electrical Eng.	Work		Eng-E		1	£3,363.30/wk	£0.00/hr	£0.00	Prorated	Standard
6	Fabr'tn Dept	Work		Fab		1	£3,363.30/wk	£0.00/hr	£0.00	Prorated	Standard

Contents: Assigning Resources

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- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
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- Case-Study

Assigning Resources

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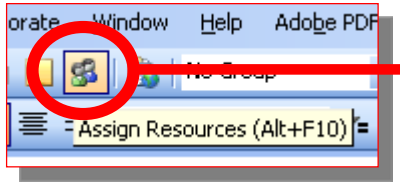
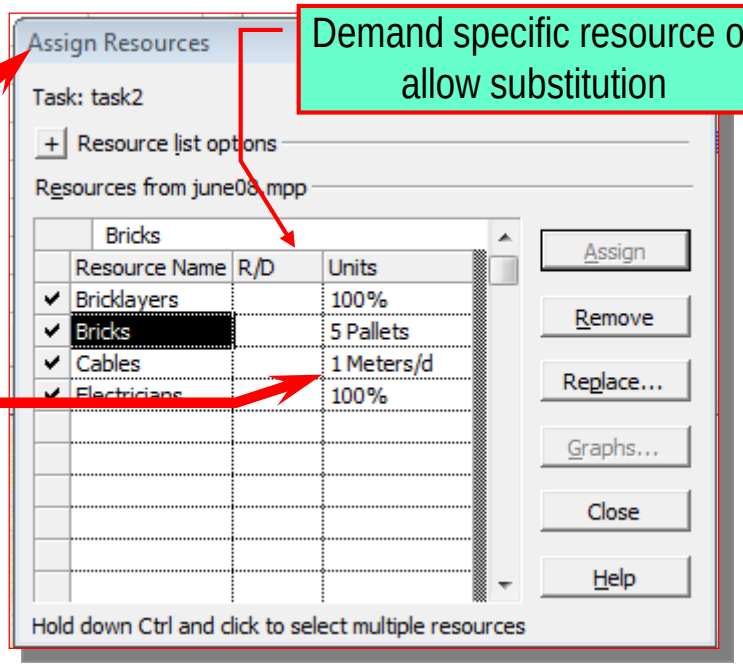
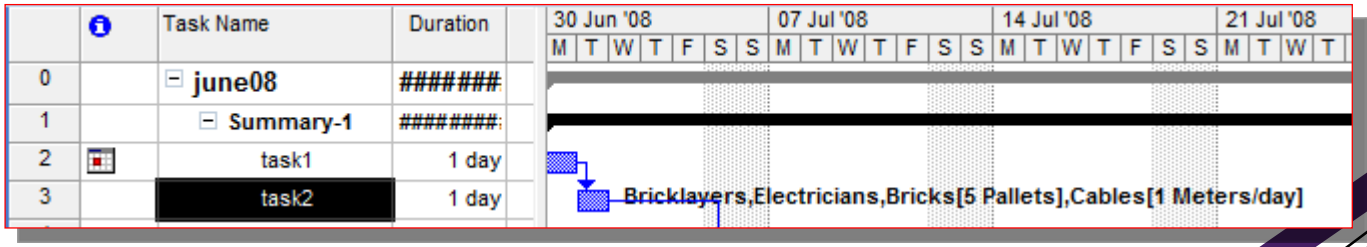
- Select a task or several !
- Assign resources





  - Materials are fixed or variable “per/period”
- Select next task – Without closing the *Assign Resources* dialogue box
  - Add new resources (with *Assign*) or *Remove* existing resources or *Replace* assignments
  - Results depend on *Task-Type* & *Effort-Driven* flag



Assignments

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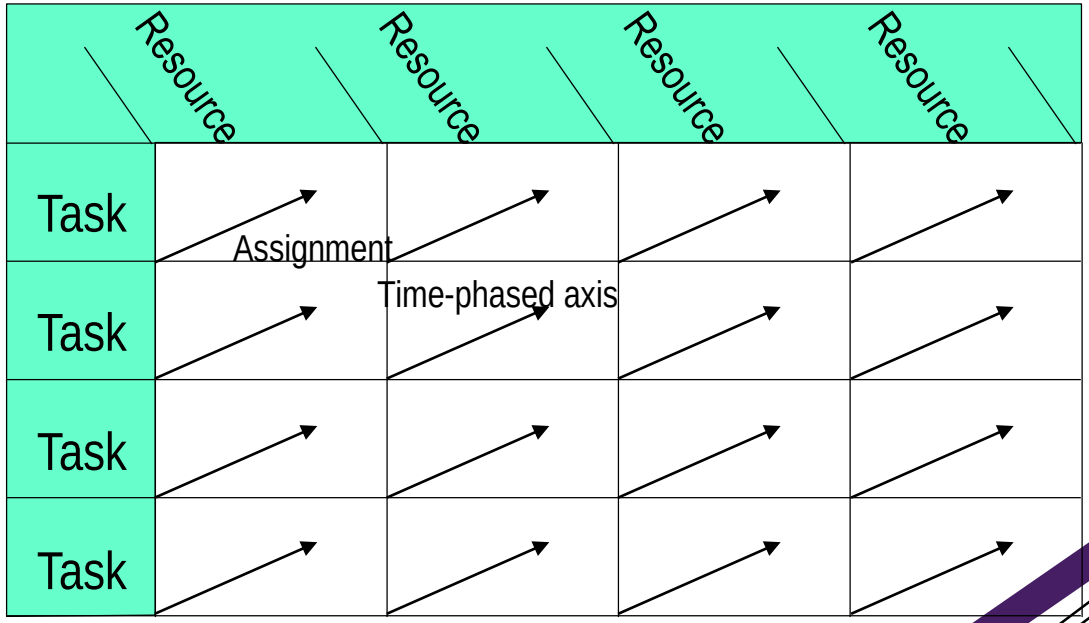
- 'Task plus Resources' = a set of time-phased work and cost allocations
  - If task duration is pre-set then
    Duration x Number of Resources assigned x Hrs per **Std Day** = Work Hours
  - Work / Duration and calendars = Time-Phased scheduling
  - MSPJ view of assignments is classic Responsibility Assignment Matrix
    - Plus time-phasing

- Many factors interact in making and changing assignments
  - Results differ if
    Initial Assignment or
    change to assignment



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Responsibility Assignment Matrix (RAM)*

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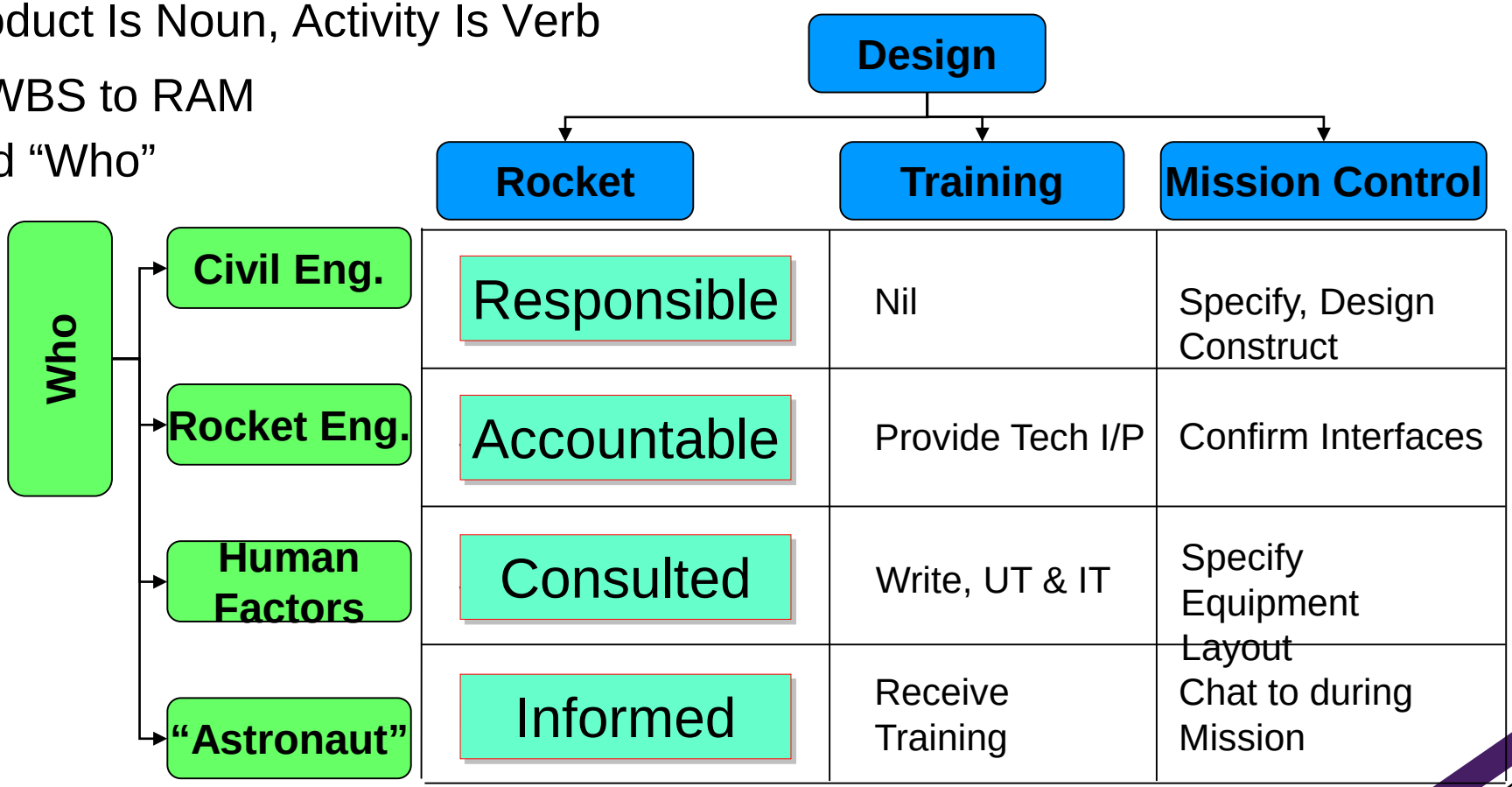
- From PBS to WBS
  - Product Is Noun, Activity Is Verb
- From WBS to RAM
  - Add “Who”



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*Also known as a RACI = Responsible Accountable Consulted & Informed

Each Assignment Is Significant To The Recipient!

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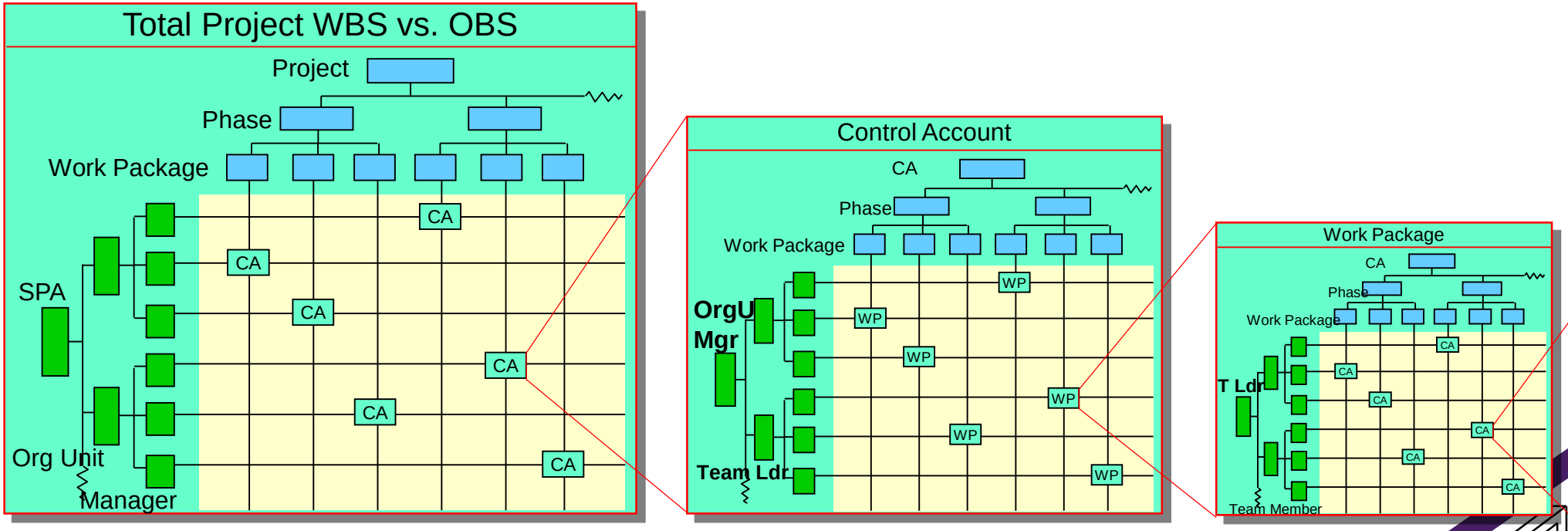
- RAM correlates the work packages in the WBS to the parties responsible for accomplishing the assigned work
  - Defined by cross-referencing the project WBS against the OBS
- Clear, single point of accountability (SPA) for specific elements of work



Cascading “Who Does What” Across The Whole Portfolio of Business Activity

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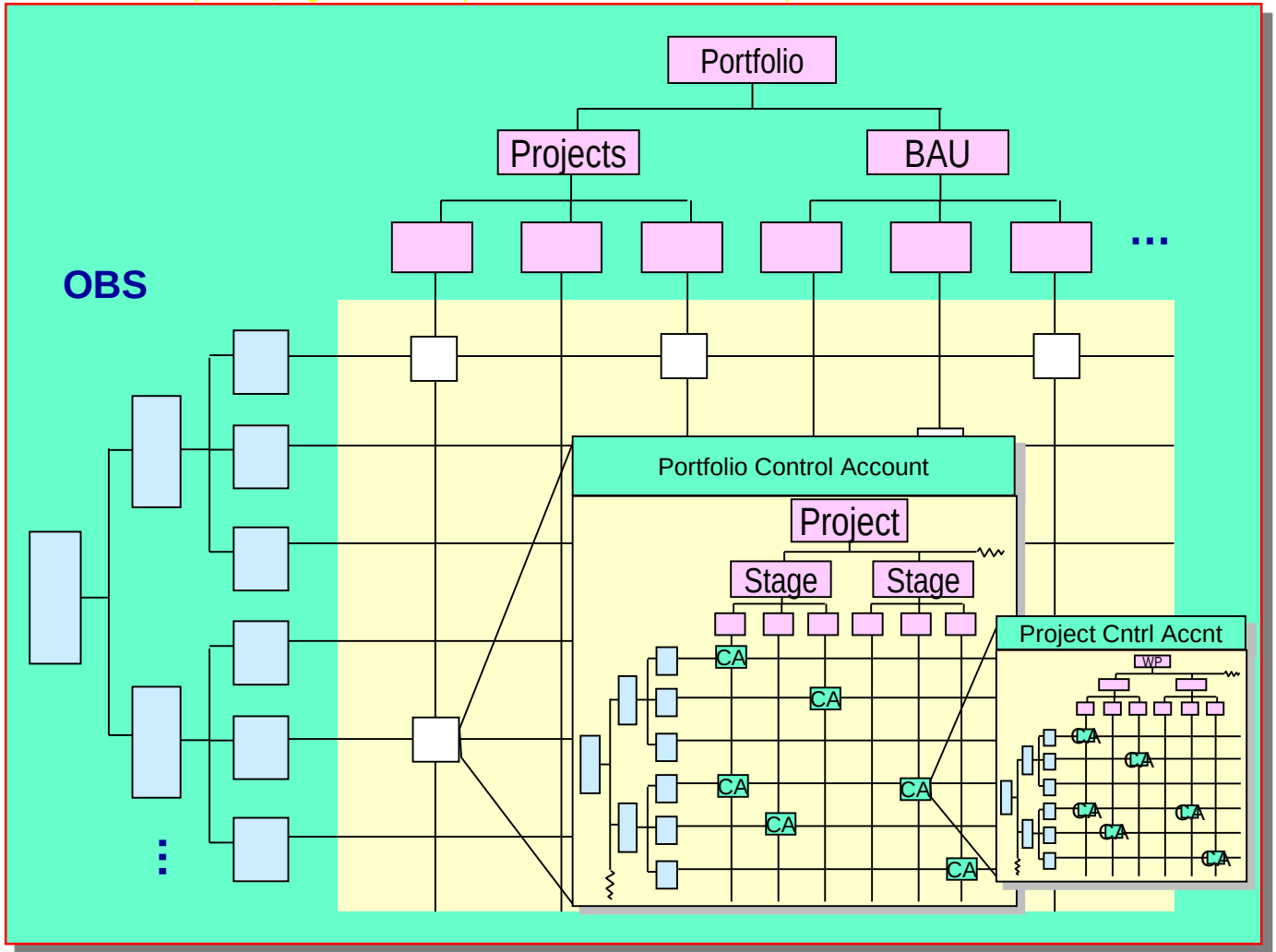

Hierarchical Breakdown of Scope

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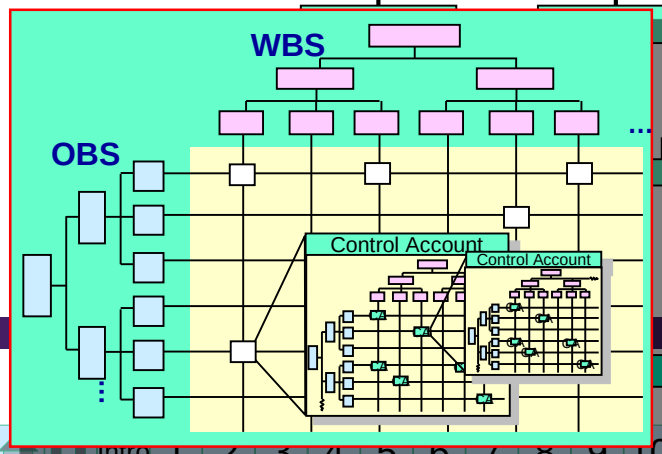
- Depth to reflect your level of control
  - IE the point at which you delegate responsibility for further detail
  - Probably 2-4 levels down
  - Chain of delegated authorities will result in conceptual, total BS being many levels deep



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Time-Phasing And Assignment Percentage

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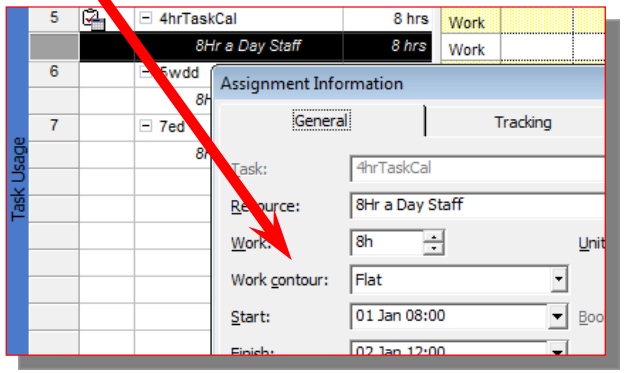
- Time-phasing is calculated from Calendars, *Duration, Work*, *Units* of assigned resource *Task-Type,* and assignment's *Work contour*
  - "Units" are a "measure of work" IE Effort
    - Assignment Units are a percentage of a resource's working calendar hours
    - EG I'm available 4hrs/day and working on two tasks at 50% each = 2hr/day



- Assignment data is distributed down and aggregated up the hierarchy depending on what level it is entered at
  - *Work*, *Units* and *Duration* are re-balanced across assignments when changed
  - Convenient flexibility but also a trigger for confusion and frustration
    - If you EVER chase around edits to assignments/ duration/ work: Stop!
    - Your *Task-Type* and *Effort-Driven* settings are probably in-correct

Assignment Units and Percentage

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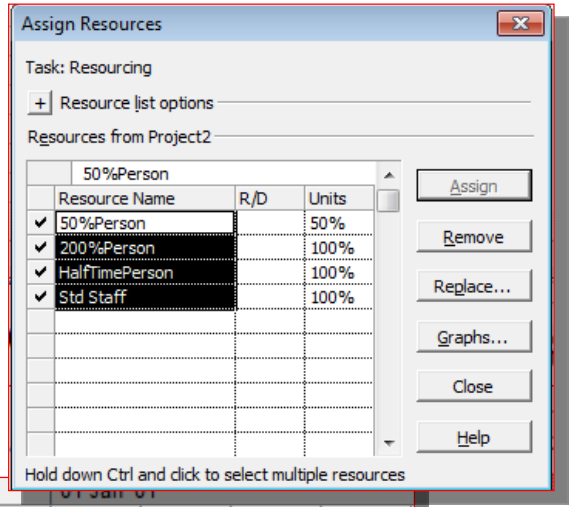
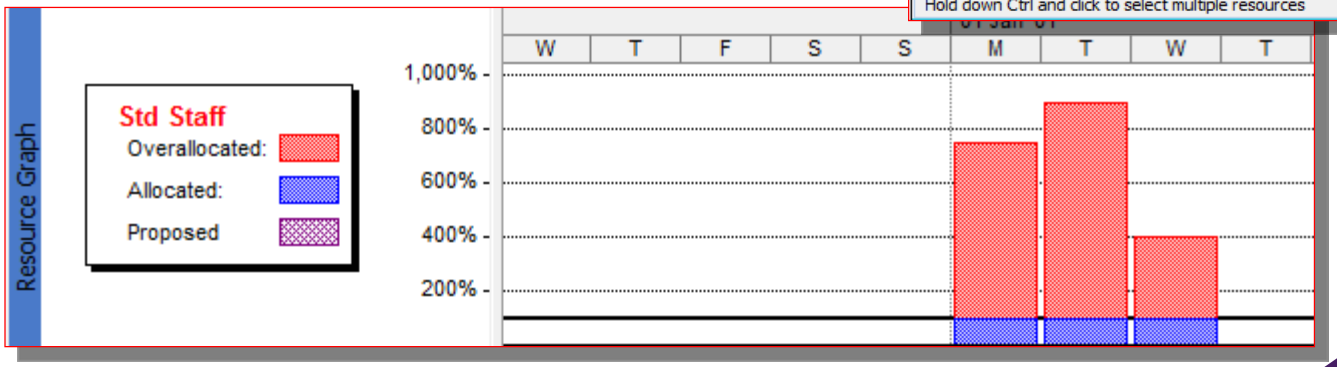
- Default assignment is *Max Units* or 100%
  - For people "*Max.Units*" ≈ Head-Count or FTEs (Full Time Equivalents)
  - For tasks "*Assignment Units*" = %age of "*Max.Units*"
  - Availability can be a decimal
    Tools | Options | Schedule-Tab | Show Assignment As

- *Max*. *Units* marks the level of assigned resource beyond which the resource is flagged 'Over-Allocated'
  - Only detectable in the Resource views





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Scheduling With Calendars

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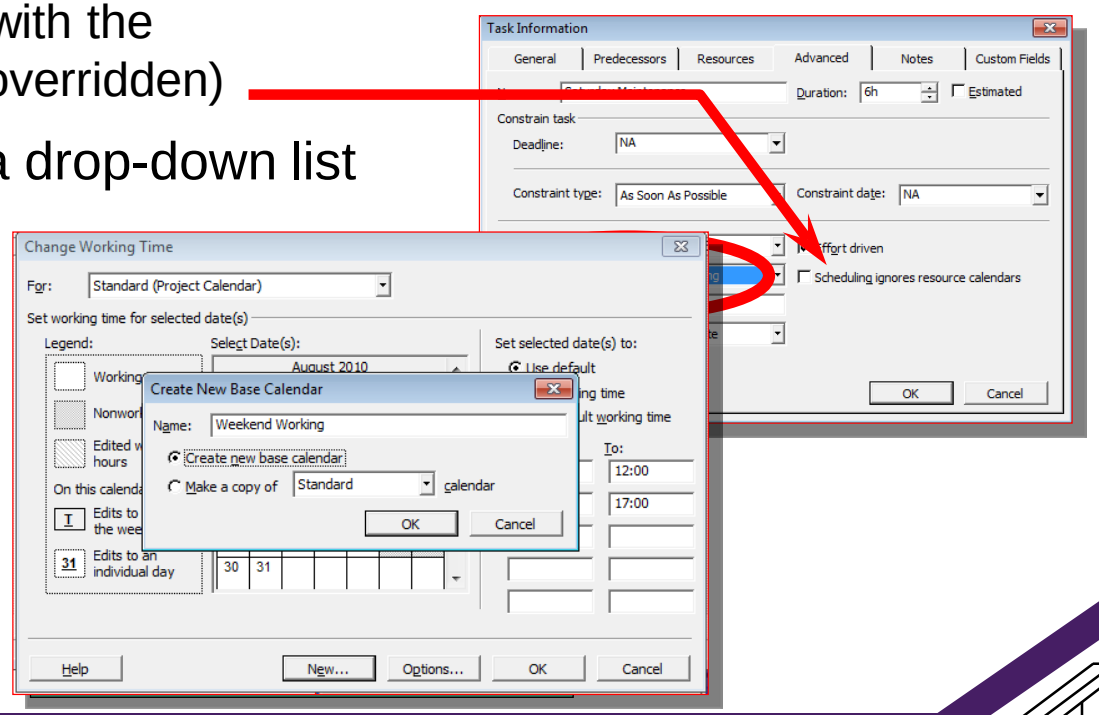
- Tasks are first scheduled according to the project calendar
  - If the assigned resource has a different working pattern the task is scheduled to the resource's calendar*
  - If the task has a calendar it overrides the project calendar
    - Task calendars are combined with the resource's availability (unless overridden)
- Task calendars are selected from a drop-down list so must be specifically pre-created
  - *Tools | Change Working Time | New: Set the "name" and details*
  - Assign to relevant tasks
  - Select tasks:
    Task Information | Advanced-Tab | Calendar: "name"



* But not on the project's first day!☹

Resource Profiles

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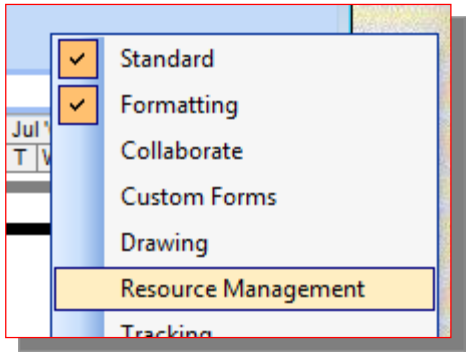
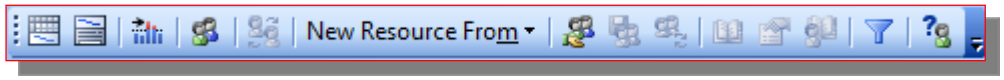
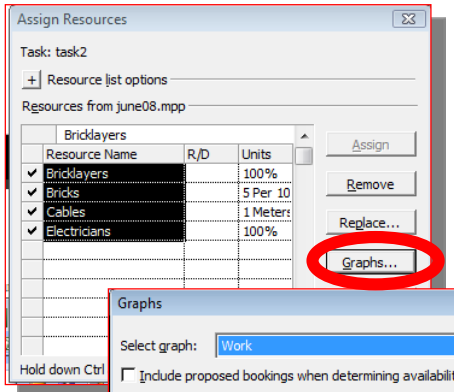
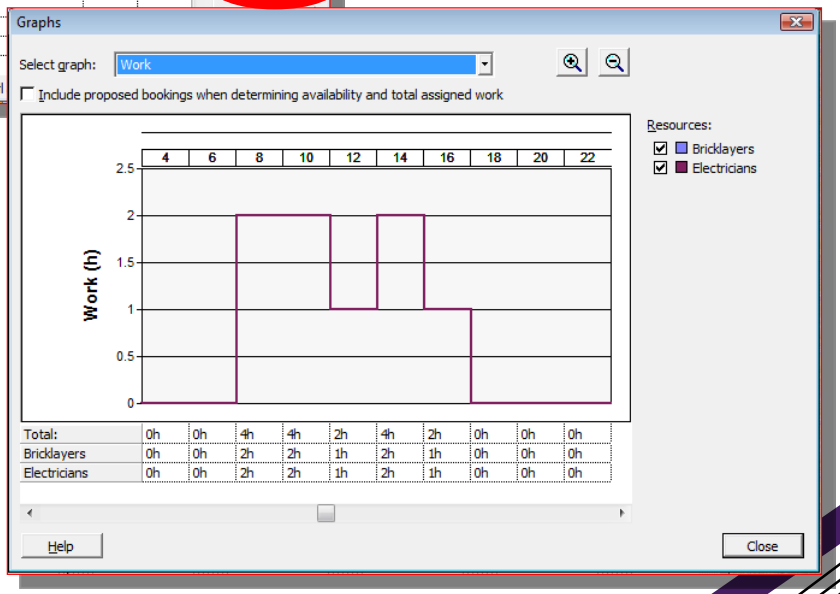
- While assigning resources it is possible to see the resource's commitment level
- Wait till project has first-cut 'ideal scheduling' and then resolve issues using the *resource management toolbar*
- Realistic schedules can normally only be achieved with a *Usage* view









Contents: Assigning Resources – Task Type

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- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
- Task-Usage and Assignment Sheets
- Summary
- Case-Study

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Task Type

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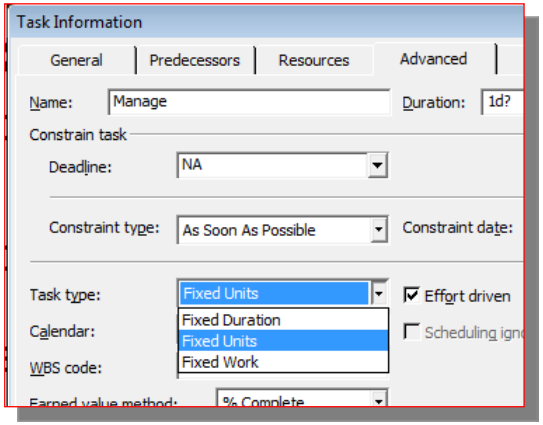
- A task can be
  - Fixed-Work (by definition Effort Driven)
  - Fixed-Units & Effort Driven
  - Fixed-Duration & Effort Driven
  - Fixed-Units
  - Fixed-Duration



- Task-Type is used when Duration, Work, Resource relationship exists
  - Which dependant factor to change when any other factor is amended
  - EG Add resources to a fixed duration task: MSPJ will reduce *Units* or add *Work*

	Task Name	Work	Duration	01 Jan '01
				S S M T W T F S
1	FD-Ed	16 hrs	2 days	Simon
2	FD-Ned	16 hrs	2 days	Simon

Task Name	Work	Duration	01 Jan '01	08 Jan '01
			S S M T W T F S S	M T W T F S S
FD-Ed	16 hrs	2 days	Simon[33%],Fred[33%],Mary[33%]	
FD-Ned	48 hrs	2 days	Simon,Fred,Mary	

Initial Assignments

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- Initial assignment uses the **number** of resources assigned
  - Computes a relationship between Duration and Work and Units
- Two actions are performed by MSPJ on initial assignment

1. Initial assignment calculates *duration* and or *work* and or *assigned resource units*
   - Based on resources initially assigned, the elements of work and duration pre-set and the task's *Task-Type/ Effort-Driven status*
   - Default data entry tables include *Duration* but not *Work* ☹
     - 'Expectation' is that Initial Assignment of resources (IE Units) sets *Work* based on *Duration* times number of assigned resources
   - What-ever you pre-set MSPJ will use initial resource assignment to calculate a task's other initial values
2. MSPJ then schedules time-phased assignment of the resources over the duration and work-load

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Initial Scheduling

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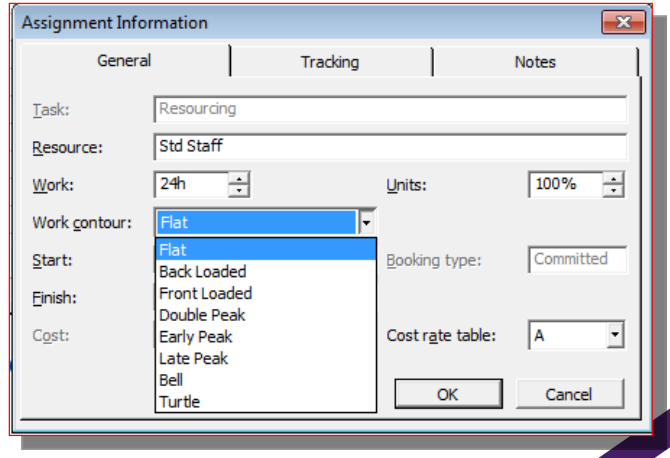
- Initial assignment immediately schedules the calculated work, duration and resource assignments
  - Work and relevant calendars determine duration
    - Dependencies determine start or finish
    - The other date is determined by simple arithmetic
    - Start + Duration = Finish or Finish – Duration = Start

- By default assignment-units are spread evenly over task's duration
  - Alternate distributions available
    - Contour affects *Duration* & *Work*!
      See ResouceProfiles.mpp
  - MSPJ's "guesses" are a start point for editing in a *Usage Sheet* (if precision is needed)



Effect of Task-Type on Assignments

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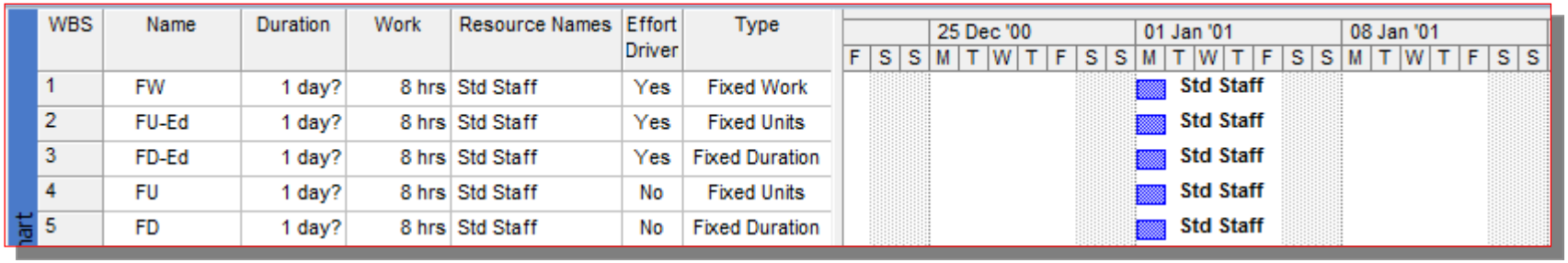
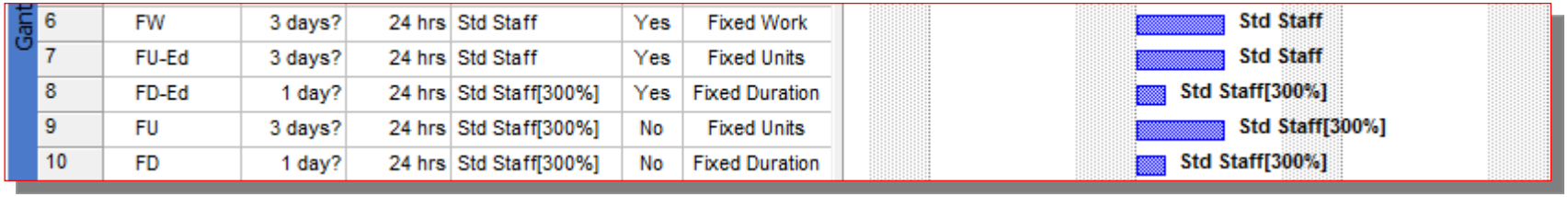
- When assigning a standard 8hr per day staff member to a task without specification of work – work is calculated



WBS	Name	Duration	Work	Resource Names	Effort Driver	Type
1	FW	1 day?	8 hrs	Std Staff	Yes	Fixed Work
2	FU-Ed	1 day?	8 hrs	Std Staff	Yes	Fixed Units
3	FD-Ed	1 day?	8 hrs	Std Staff	Yes	Fixed Duration
4	FU	1 day?	8 hrs	Std Staff	No	Fixed Units
5	FD	1 day?	8 hrs	Std Staff	No	Fixed Duration

  - Duration * Units (of Resource) * Hours per Std Day * Contour = Work
- Affect of assigning same staffer to task with 24hrs work pre-specified



6	FW	3 days?	24 hrs	Std Staff	Yes	Fixed Work
7	FU-Ed	3 days?	24 hrs	Std Staff	Yes	Fixed Units
8	FD-Ed	1 day?	24 hrs	Std Staff[300%]	Yes	Fixed Duration
9	FU	3 days?	24 hrs	Std Staff[300%]	No	Fixed Units
10	FD	1 day?	24 hrs	Std Staff[300%]	No	Fixed Duration

  - Task Type determines how Work / {Units or Duration} = {Duration or Units}
    - Contouring is ignored in discussions of auto-scheduling from now on

Affect of Initial Assignment When Work Is Not Set 1/3

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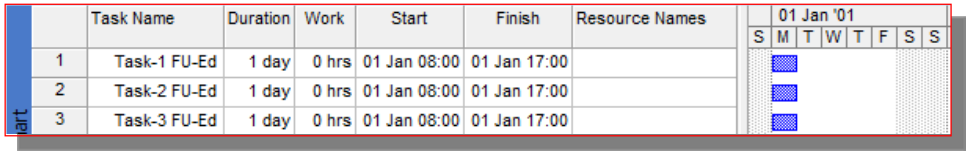
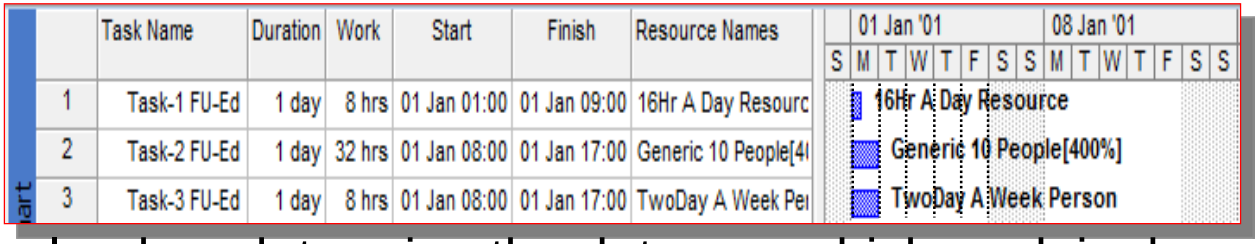
- Initially effort is determined from Task-Duration and Resource-Units assigned

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
2	Task-2 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
3	Task-3 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	



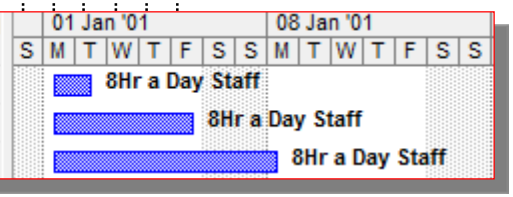
- Assigning resources sets the amount of work

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	8 hrs	01 Jan 01:00	01 Jan 09:00	16Hr A Day Resourc
2	Task-2 FU-Ed	1 day	32 hrs	01 Jan 08:00	01 Jan 17:00	Generic 10 People[4
3	Task-3 FU-Ed	1 day	8 hrs	01 Jan 08:00	01 Jan 17:00	TwoDay A Week Per



- Project and resource calendars determine the dates on which work is done
  - Task-1 is 1d working day's duration (wdd) and assigned to one resource ∴
    - Work = Standard day (8 hrs) * 1wdd * 1 resource = 8 work hrs
    - '16hr Person' starts work at 01:00 so task completed by 09:00 (Project StartDate 31/12)

	Task Name	Work	Duration	Start	Finish	Resource
5	4hrTaskCal	8 hrs	1 day?	01 Jan 08:00	02 Jan 12:00	8Hr a Day
6	5wdd	40 hrs	5 days	01 Jan 08:00	05 Jan 17:00	8Hr a Day
7	7ed	168 hrs	7 edays	01 Jan 08:00	08 Jan 08:00	8Hr a Day



    - Task calendar affects scheduling but not the work calculation (but edays do!)

wdd = Working Days Duration,
eww = Elapsed Working Weeks (etc) so 1ewd = Elapsed Working Day, & C for Calendar!

Affect of Initial Assignment When Work Is Not Set 2/3

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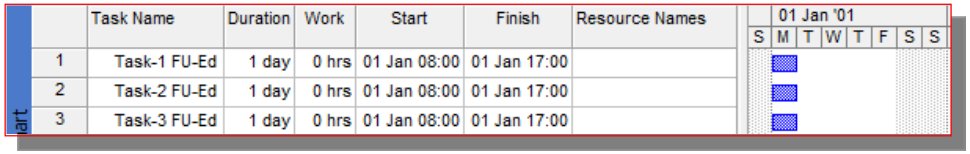
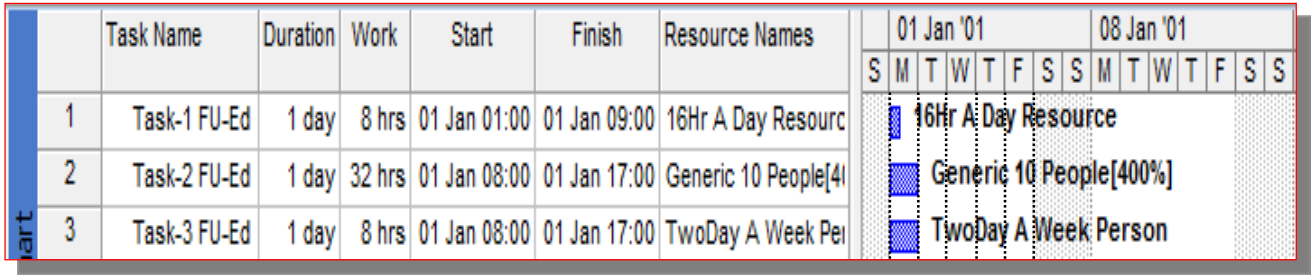
- Initially effort is determined from Task-Duration and Resource-Units assigned

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
2	Task-2 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
3	Task-3 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	



- Task-2 1wdd x 4 resources x 8 Std day hrs = 32 work hrs
  - 4 people start work at 08:00 so (with lunch) have delivered 32hrs effort by 17:00



- Task-3 1wdd x 1 resource x 8 Std day hrs = 8 work hrs
  - TwoDayaWeekPerson starts 08:00 and finishes (with lunch) by 17:00

Affect of Initial Assignment When Work Is Not Set 3/3

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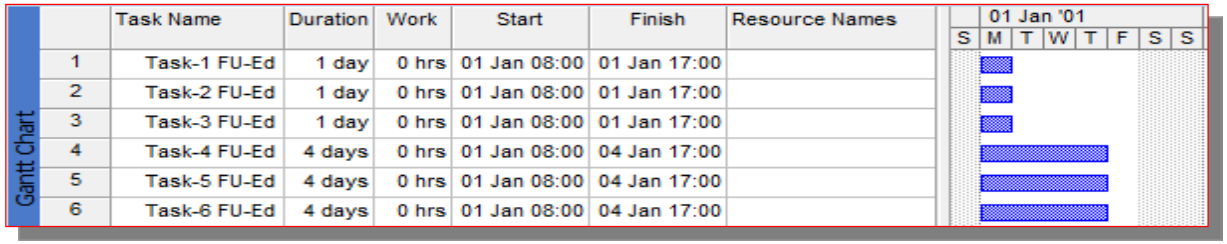
- Task-4 is 4wdd * 1 resource * 8 Std day hrs = 32 work hrs
  - But '16Hr Person' does 2 Working Days per Calendar Day so Task-4 is scheduled in 2 calendar days (Note: 'Duration' is shown as 4☹)

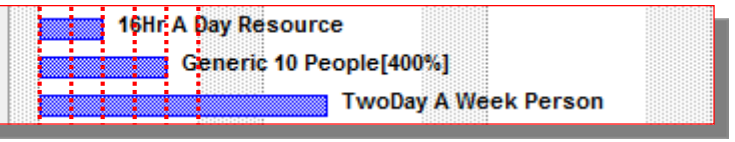
Gantt Chart

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
2	Task-2 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
3	Task-3 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
4	Task-4 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	
5	Task-5 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	
6	Task-6 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	



Gantt Ch

4	Task-4 FU-Ed	4 days	32 hrs	01 Jan 01:00	02 Jan 17:00	16Hr A Day Resource
5	Task-5 FU-Ed	4 days	128 hrs	01 Jan 08:00	04 Jan 17:00	Generic 10 People[400%]
6	Task-6 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person



- T5's work is 4wdd * 4 Resources * 8hrs/day = 128 work hrs
  - Since 4 8hr_a_day resources assigned in parallel duration is 4 working days
- T6's effort (work) is calculated as 4wdd * 1 Resource * 8 Std hrs = 32w_hrs
  - TwoDayPerson only works Mon & Tuesday so scheduling takes 1½ weeks
  - Note: Duration (wrongly?) shown as 4d – IE 4wdd not 4edd

Assigning Resource To Task With Pre-Estimated Work 1/3

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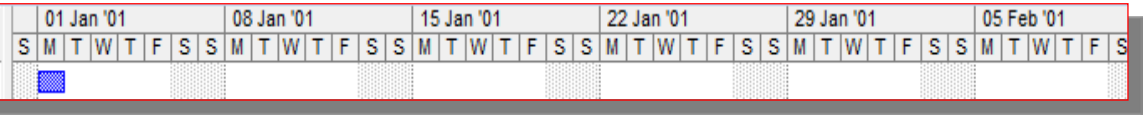
- Tasks entered with work defined rather than duration

	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	



- Task-1's working duration of 80hrs/ (8hr per day * 1 resource) = 10wdd
  - 10wd scheduled at 2d/ week = 5 elapsed_working_weeks (eww)

	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	10 days?	80 hrs	Mon 01/01/01	Tue 30/01/01	TwoDay A Week Person

Assigning Resource To Task With Pre-Estimated Work 2/3

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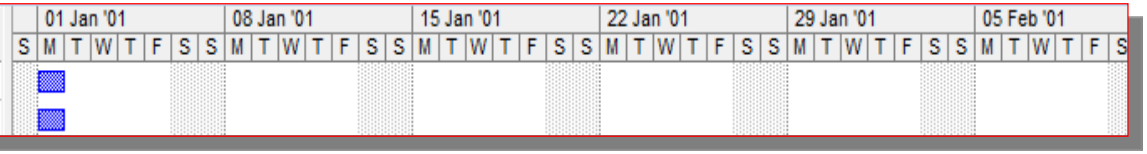
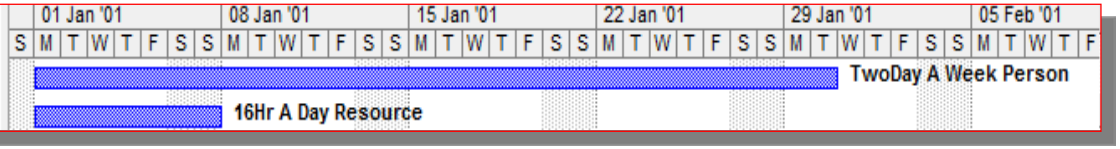
- Task-2 identical to Task-1

	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	
10	Task-2	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	



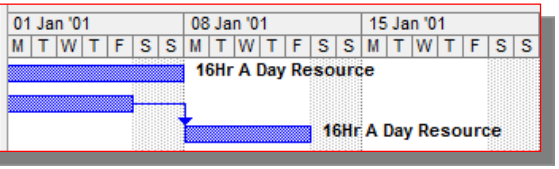
- Task-2's 80hrs_work / (8hr per day * 1 resource) also = 10wdd
  - 10wdd scheduled at 16hr/ day = 1 elapsed_working_week or 5ewd

	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	10 days?	80 hrs	Mon 01/01/01	Tue 30/01/01	TwoDay A Week Person
10	Task-2	10 days?	80 hrs	Mon 01/01/01	Mon 08/01/01	16Hr A Day Resource



  - Note: (in this case) Project start is 08:00 so Task-2's end is Monday

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-2	10 days?	80 hrs	Mon 01/01/01	Mon 08/01/01	16Hr A Day Resourc
2	5day ta	5 days	0 hrs	Mon 01/01/01	Fri 05/01/01	
3	Task-2	10 days?	80 hrs	Mon 08/01/01	Fri 12/01/01	16Hr A Day Resourc



If scheduled a week later it fits in the week (or if project start date was defined with a time & date)

	Task Name	Work	Details	01 Jan '01 S	M	T	W	T	F	S	S	08 Jan '01 M	T	W	T	F
1	Task-2	80 hrs	Work		9h	16h	16h	16h	16h			7h				
	16Hr A Day Resourc	*80 hrs*	Work		9h	16h	16h	16h	16h			7h				
2	5day task	0 hrs	Work													
3	Task-2	80 hrs	Work									16h	16h	16h	16h	16h
	16Hr A Day Resourc	*80 hrs*	Work									16h	16h	16h	16h	16h

Assigning Resource To Task With Pre-Estimated Work 3/3

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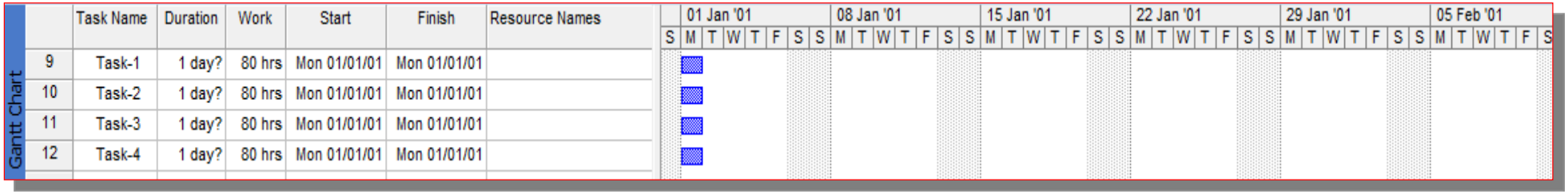
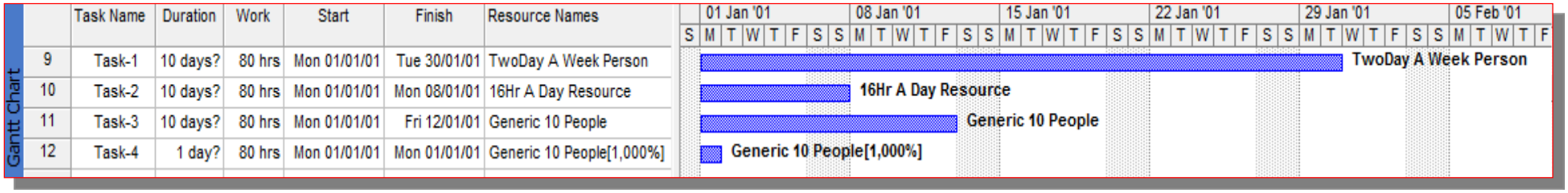
- Tasks 3 and 4 identical to 1 and 2



	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	
10	Task-2	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	
11	Task-3	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	
12	Task-4	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	

- Task-3's 80hrs_wd / (8hr per day * 1 resource) also = 10wdd
  - 10wdd scheduled at 8w hr/ day = 10wdd (!) = 2 elapsed_working_weeks



	Task Name	Duration	Work	Start	Finish	Resource Names
9	Task-1	10 days?	80 hrs	Mon 01/01/01	Tue 30/01/01	TwoDay A Week Person
10	Task-2	10 days?	80 hrs	Mon 01/01/01	Mon 08/01/01	16Hr A Day Resource
11	Task-3	10 days?	80 hrs	Mon 01/01/01	Fri 12/01/01	Generic 10 People
12	Task-4	1 day?	80 hrs	Mon 01/01/01	Mon 01/01/01	Generic 10 People[1,000%]

- Task-4's 80hrs_wd / (8hrs per day * 10 resources) = 80 / 80 = 1 ewd
  - 80hrs work taking 10wd scheduled on 1 ewd
    Duration shown as 1 not 10!?

Initial Assignment: The Full Story (Ignoring Contouring)

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- Completely reliable results only achieved in *Usage Views* (I think)

	Task Name	Work	Duration	Resource Names
1	Dur'tn Set	40 hrs	1 day	
2	FW	8 hrs	1 day	Staff
3	FU	8 hrs	1 day	Staff
4	FD	8 hrs	1 day	Staff
5	FU-Ed	8 hrs	1 day	Staff
6	FD-Ed	8 hrs	1 day	Staff
7	Work-Set	120 hrs	3 days?	
8	FW	24 hrs	3 days?	Staff
9	FU	24 hrs	3 days?	Staff[300%]
10	FD	24 hrs	1 day?	Staff[300%]
11	FU-Ed	24 hrs	3 days?	Staff
12	FD-Ed	24 hrs	1 day?	Staff[300%]
13	BothSet	120 hrs	3 days	
14	FW	24 hrs	3 days	Staff
15	FU	24 hrs	3 days	Staff[150%]
16	FD	24 hrs	2 days	Staff[150%]
17	FU-Ed	24 hrs	3 days	Staff
18	FD-Ed	24 hrs	2 days	Staff[150%]

Gantt Chart

01 Jan '01 | 08 Jan '01 | 15 Jan '01 | 22 Jan '01 | 29 Jan '01

S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S

Staff
Staff
Staff
Staff
Staff
Staff
Staff[300%]
Staff[300%]
Staff
Staff[300%]
Staff
Staff[150%]
Staff[150%]
Staff
Staff[150%]

Assign Resources

Multiple tasks selected (2,3,4,5,6,8,9,10,11,12,14,15,16,17,18)

Resource list options

Resources from Project5

Resource Name	R/D	Units
Staff		

Assign
Remove
Replace...
Graphs...
Close
Help

Hold down Ctrl and click to select multiple resources

Initial Entry

Initial Assignment
1 person

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15m Exploring What We Just Covered

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- 15m – Enough to see the complexity and interaction
  - We need to cover more before you can develop full understanding
  - Don't expect full understanding now (in just 15mins!) It's a bonus if you do!
- Try experimenting with the previous concepts to create and assign resources
  - Create tasks with the 5 Task Types and Effort-Driven combinations
    - Leave importing to the next case study segment
  - Try creating your own first THEN if you want further, methodical experimentation try the given file
    - The file *Task-Types.mpt* already contains tasks and resources
    - Open As Copy? (or close without saving or save to a new name)
    - Summary tasks names reflect the resources to assign
- Next exploration is on CHANGES to initial assignments (in just 11 slides time)

Contents: Fixed Duration, Fixed Units and Effort Driven

Another Concentrate first then play!

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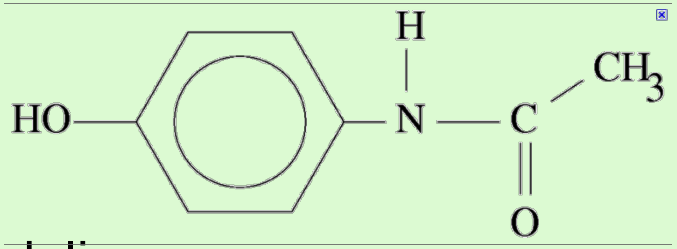

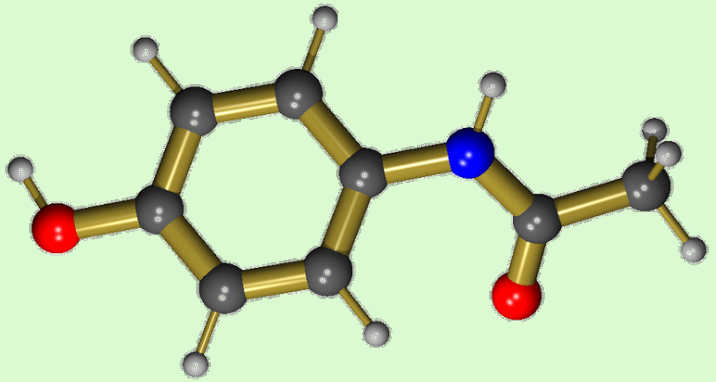

- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
- Task-Usage and Assignment Sheets
- Summary
- Case-Study

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Why are there no Aspirin in the jungle? Cos the parrots eat 'em all. The paracetomol molecule flags-up that this section may give you a headache on first reading (or put another way may need several visitations)

Fixed Duration and Fixed Units ± Effort Driven

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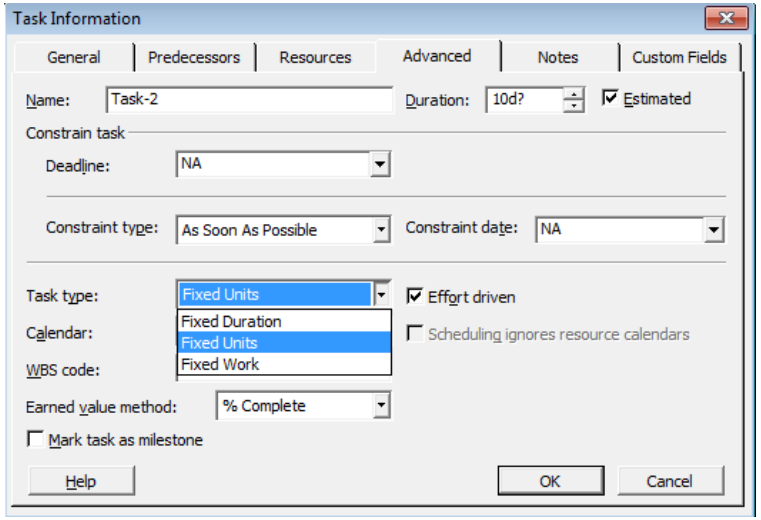
- *Task Type* specifies what is recalculated when changing a task's effort, assignments and work-load
  - Fixed Units + Effort driven is the default (IE *Duration* determines *Work*)
  - Effort Driven also the default for Fixed Duration
  - Fixed Work is by definition 'Effort Driven'
- If one of Effort, Duration or Resource is changed & 1 is fixed so the third is recalculated
- EG Fixed Duration
  - If I alter Work then
    Work / Duration = re-calculated Units
  - If I alter Units then
    Units x Duration = re-calculated Work
  - If I manually alter Duration then Duration x Units = re-calculated Work



MSPJ Logic Often Opaque!

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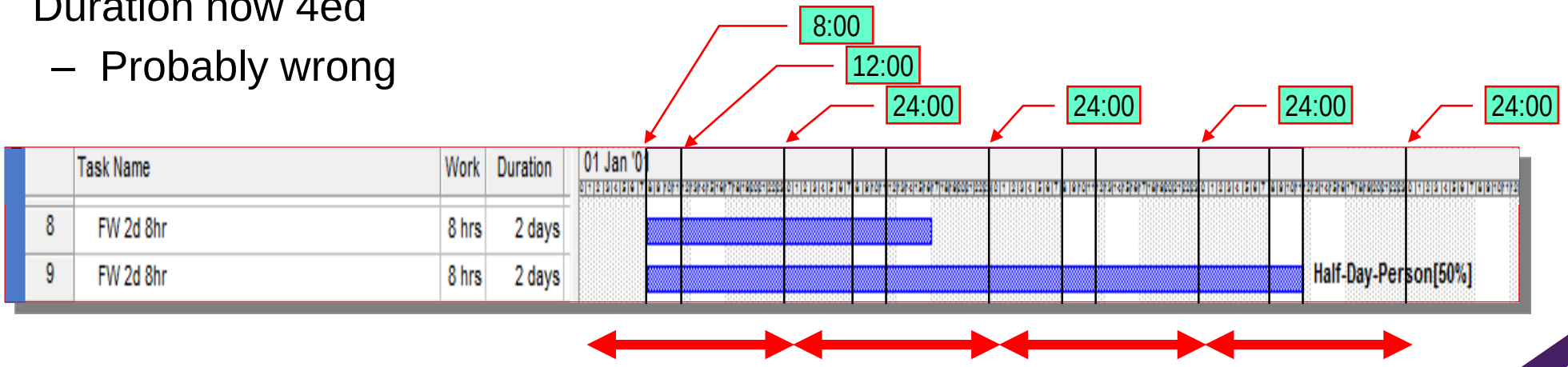
- Before and after assigning resource to a FW 8hr 2d task (IE ½ time)
  - Resource's working pattern is 08:00 to 12:00 (IE Also ½ time)
  - MSPJ assigns ½ time person ½ time

Task Usage

	Task Name	Work	Details	01 Jan '01 S	M	T	W	T	F
8	FW 2d 8hr	8 hrs	Work		4h	4h			
9	FW 2d 8hr	8 hrs	Work		2h	2h	2h	2h	
	Half-Day-Person	*8 hrs*	Work		2h	2h	2h	2h	

- Duration now 4ed
  - Probably wrong



MSPJ Warns For Some Changes

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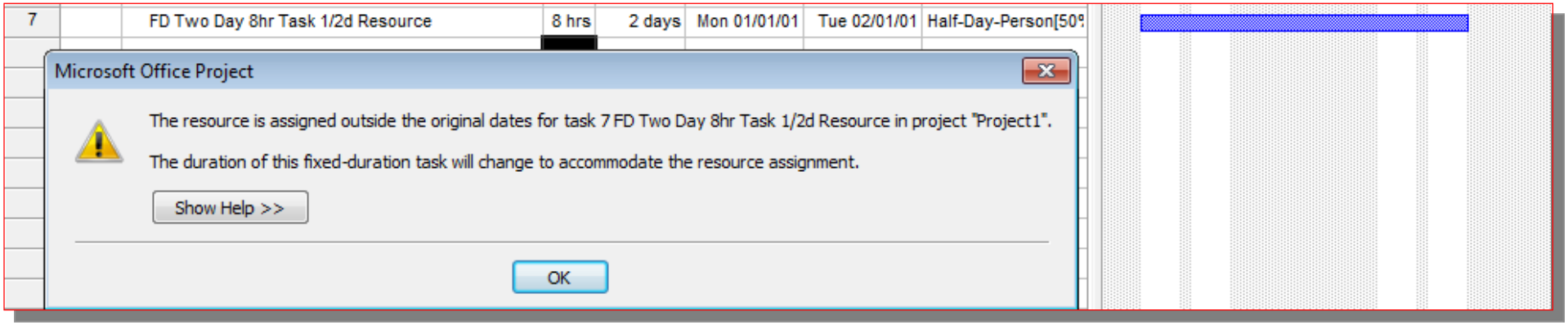
- Warnings issued when ‘impossible’ instructions received
  - FD-Ed 2wdd 8Hr task given to a 4hr/day resource scheduled ½ time



- At 2hr/day task is either 2wdd and ∴ 4hr work or really 8hr work and ∴ 4wdd
  - MSPJ makes the change then tells you

MSPJ Questions Some Changes

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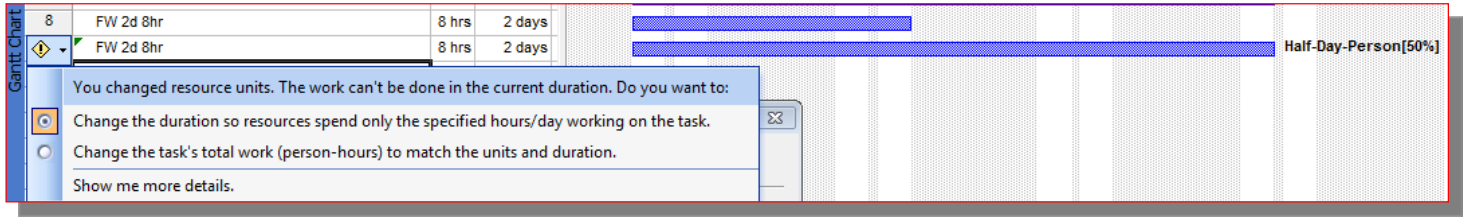
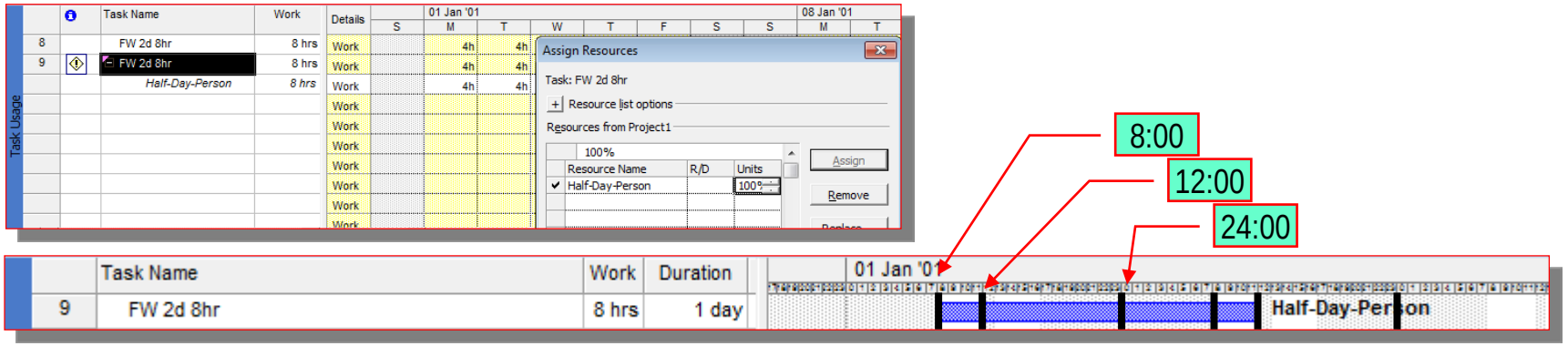
- Corrections can be frustratingly difficult to apply (Hence 2010 dumb-down)
  - Reconsider the Task-Type and Effort-Driven settings



- Resource assignment and Task-Usage (or Resource-Usage) best tools
  - Sometimes (always?) helps to temporarily set Work to 0



  - Duration is 1.5 ewdd or 1wdd spread over 1.5 calendar days

What Get Changed!

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- If a task is Fixed ‘Whatever’ its whatever only changes through human input never by recalculation
  - Fixed units is the default

What You Change

Task type

	Duration	Units	Work
Fixed Duration	Work	Work	Units
Fixed Units	Work	Duration	Duration
Fixed Work	Units	Duration	Duration

What MSPJ Adjusts

- Fixed units: resources remain constant if duration or work is changed
- Fixed work: change to duration amends resourcing to maintain ‘effort’
- Fixed duration: change to work recalculates units to maintain duration

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Exploring Change To Duration, Work and Units

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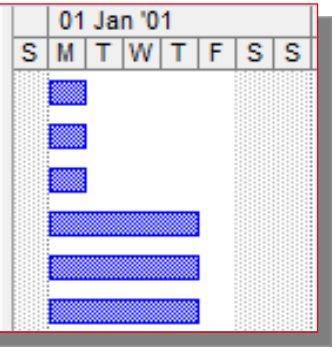
- A resource's availability is described by their calendar

	Resource Name	Type	Initials	Max. Units	Base Calendar
1	16Hr A Day Resource	Work	16hr	100%	16HrDay
2	Generic 10 People	Work	10p	1,000%	Standard
3	TwoDay A Week Person	Work	2Day	100%	TwoDayWeek

- A task's *duration* or *work* is set on first assignment and maintained on changes

Gantt Chart

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
2	Task-2 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
3	Task-3 FU-Ed	1 day	0 hrs	01 Jan 08:00	01 Jan 17:00	
4	Task-4 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	
5	Task-5 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	
6	Task-6 FU-Ed	4 days	0 hrs	01 Jan 08:00	04 Jan 17:00	



- Task Type is relevant when task has Work defined
  - Recall Initial Assignment first determines *Work* (*duration*) then schedules

Changing Work Hours Maintains Effort (By Default – FU-Ed)

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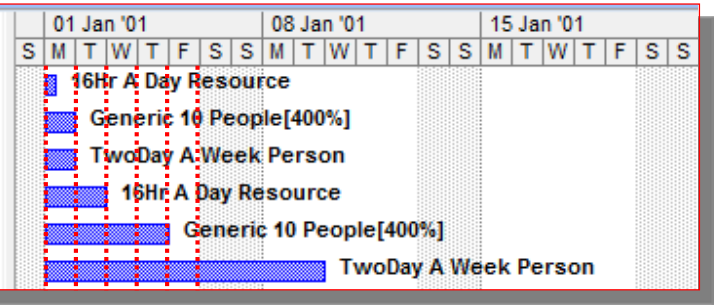
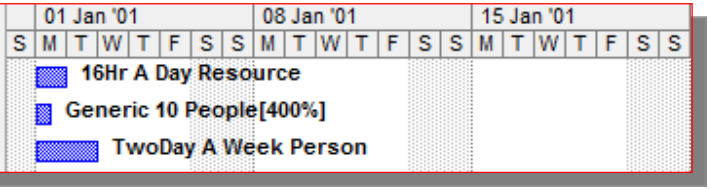
- Subsequent change to Work hours maintains 'Duration = Effort / Resources'

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	8 hrs	01 Jan 01:00	01 Jan 09:00	16Hr A Day Resource
2	Task-2 FU-Ed	1 day	32 hrs	01 Jan 08:00	01 Jan 17:00	Generic 10 People[400%]
3	Task-3 FU-Ed	1 day	8 hrs	01 Jan 08:00	01 Jan 17:00	TwoDay A Week Person
4	Task-4 FU-Ed	4 days	32 hrs	01 Jan 01:00	02 Jan 17:00	16Hr A Day Resource
5	Task-5 FU-Ed	4 days	128 hrs	01 Jan 08:00	04 Jan 17:00	Generic 10 People[400%]
6	Task-6 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person



- If Task-1 FU-Ed work is changed to 16hrs
  - 16Hr A Day Resource used for 1ed ('duration' now wrongly? shown as 2wdd)

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	2 days	16 hrs	01 Jan 01:00	01 Jan 17:00	16Hr A Day Resource
2	Task-2 FU-Ed	0.5 days	16 hrs	01 Jan 08:00	01 Jan 12:00	Generic 10 People[400%]
3	Task-3 FU-Ed	2 days	16 hrs	01 Jan 08:00	02 Jan 17:00	TwoDay A Week Person



- If Task-2 FU-Ed work changed to 16 hrs
  - Four people now only need ½ a day's duration
- If Task-3 FU-Ed work changed to 16hrs
  - Fits Two Day A Week Person's Resource Calendar

Changing Resources Maintains Effort (By Default FU-Ed)

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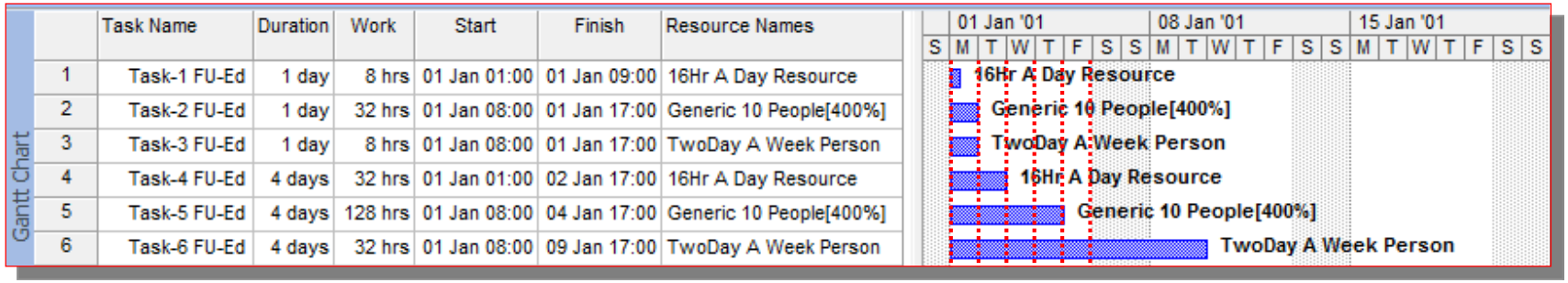
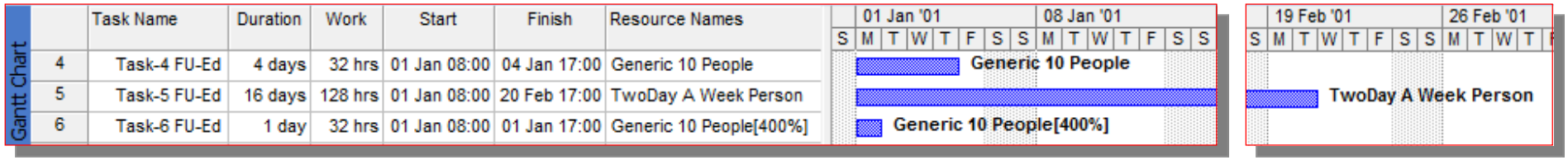
- Subsequent changes of resource maintains ‘Duration = Effort / Resources’



	Task Name	Duration	Work	Start	Finish	Resource Names
1	Task-1 FU-Ed	1 day	8 hrs	01 Jan 01:00	01 Jan 09:00	16Hr A Day Resource
2	Task-2 FU-Ed	1 day	32 hrs	01 Jan 08:00	01 Jan 17:00	Generic 10 People[400%]
3	Task-3 FU-Ed	1 day	8 hrs	01 Jan 08:00	01 Jan 17:00	TwoDay A Week Person
4	Task-4 FU-Ed	4 days	32 hrs	01 Jan 01:00	02 Jan 17:00	16Hr A Day Resource
5	Task-5 FU-Ed	4 days	128 hrs	01 Jan 08:00	04 Jan 17:00	Generic 10 People[400%]
6	Task-6 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person

- If T4 is reassigned to a resource with a “standard” calendar: now 4wdd in 4ed



	Task Name	Duration	Work	Start	Finish	Resource Names
4	Task-4 FU-Ed	4 days	32 hrs	01 Jan 08:00	04 Jan 17:00	Generic 10 People
5	Task-5 FU-Ed	16 days	128 hrs	01 Jan 08:00	20 Feb 17:00	TwoDay A Week Person
6	Task-6 FU-Ed	1 day	32 hrs	01 Jan 08:00	01 Jan 17:00	Generic 10 People[400%]

- If Task-5 FU-Ed reassigned to TwoDayPerson
  - Needs 8 elapsed weeks of Mon & Tue to deliver 128hrs effort or 16 wdd
- If Task-6 FU-Ed reassigned to 4 resources with a standard calendar
  - Now 4wdd in 1 elapsed calendar day’s duration

Calculation Of Work and Duration: Full Story? 1/2

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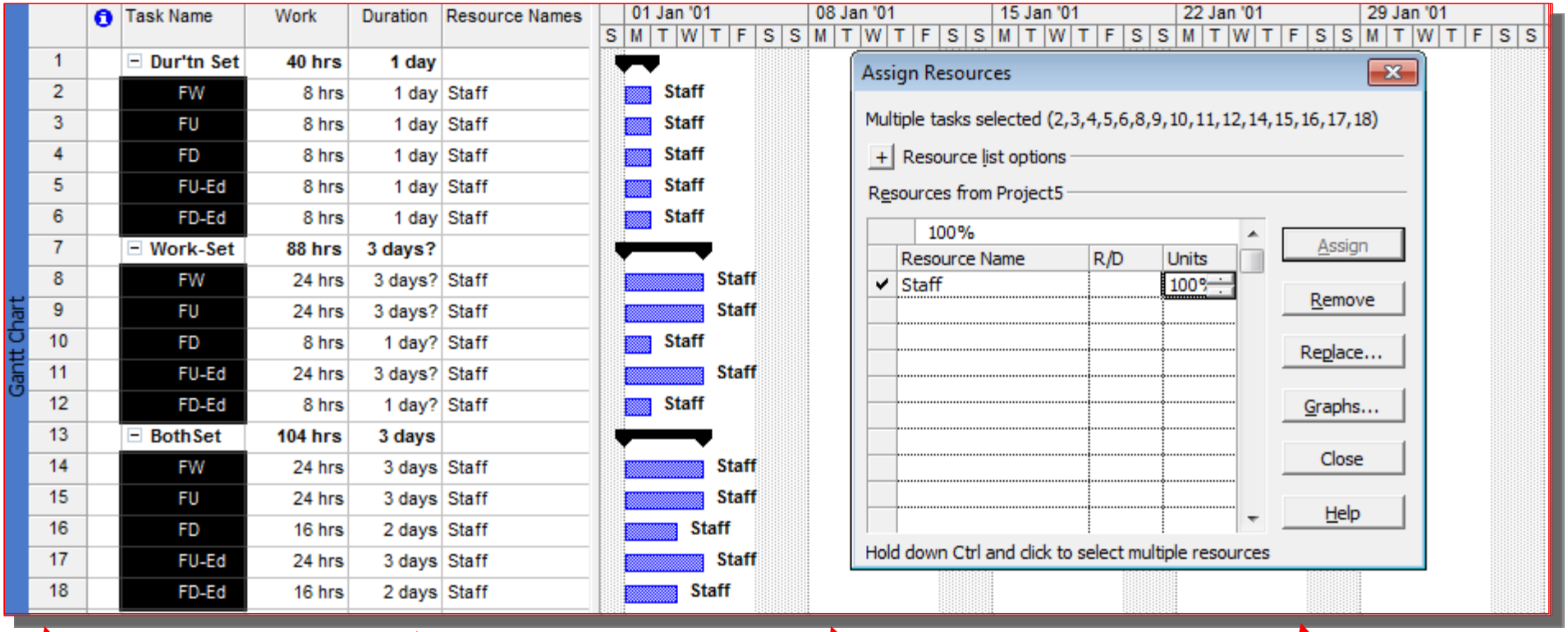
- Completely reliable results only achieved in Task-Usage (I think)



Initial Entry

Initial Assignment 1 person

Change assignment to 2 people

Change assignment back to 1 person

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Calculation Of Work and Duration: Full Story? 2/2

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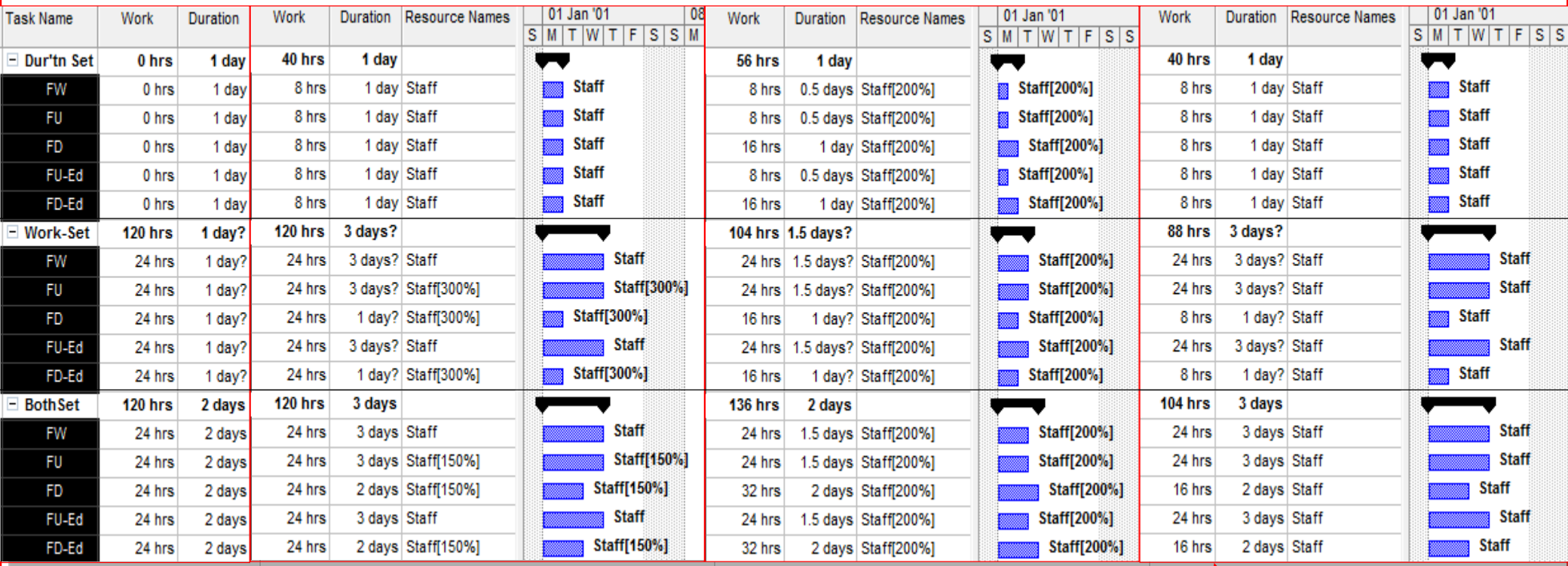
- Completely reliable results only achieved in Task-Usage (I think)

Task Name	Work	Duration	Work	Duration	Resource Names	Work	Duration	Resource Names	Work	Duration	Resource Names
Dur'tn Set	0 hrs	1 day	40 hrs	1 day		56 hrs	1 day		40 hrs	1 day	
FW	0 hrs	1 day	8 hrs	1 day	Staff	8 hrs	0.5 days	Staff[200%]	8 hrs	1 day	Staff
FU	0 hrs	1 day	8 hrs	1 day	Staff	8 hrs	0.5 days	Staff[200%]	8 hrs	1 day	Staff
FD	0 hrs	1 day	8 hrs	1 day	Staff	16 hrs	1 day	Staff[200%]	8 hrs	1 day	Staff
FU-Ed	0 hrs	1 day	8 hrs	1 day	Staff	8 hrs	0.5 days	Staff[200%]	8 hrs	1 day	Staff
FD-Ed	0 hrs	1 day	8 hrs	1 day	Staff	16 hrs	1 day	Staff[200%]	8 hrs	1 day	Staff
Work-Set	120 hrs	1 day?	120 hrs	3 days?		104 hrs	1.5 days?		88 hrs	3 days?	
FW	24 hrs	1 day?	24 hrs	3 days?	Staff	24 hrs	1.5 days?	Staff[200%]	24 hrs	3 days?	Staff
FU	24 hrs	1 day?	24 hrs	3 days?	Staff[300%]	24 hrs	1.5 days?	Staff[200%]	24 hrs	3 days?	Staff
FD	24 hrs	1 day?	24 hrs	1 day?	Staff[300%]	16 hrs	1 day?	Staff[200%]	8 hrs	1 day?	Staff
FU-Ed	24 hrs	1 day?	24 hrs	3 days?	Staff	24 hrs	1.5 days?	Staff[200%]	24 hrs	3 days?	Staff
FD-Ed	24 hrs	1 day?	24 hrs	1 day?	Staff[300%]	16 hrs	1 day?	Staff[200%]	8 hrs	1 day?	Staff
BothSet	120 hrs	2 days	120 hrs	3 days		136 hrs	2 days		104 hrs	3 days	
FW	24 hrs	2 days	24 hrs	3 days	Staff	24 hrs	1.5 days	Staff[200%]	24 hrs	3 days	Staff
FU	24 hrs	2 days	24 hrs	3 days	Staff[150%]	24 hrs	1.5 days	Staff[200%]	24 hrs	3 days	Staff
FD	24 hrs	2 days	24 hrs	2 days	Staff[150%]	32 hrs	2 days	Staff[200%]	16 hrs	2 days	Staff
FU-Ed	24 hrs	2 days	24 hrs	3 days	Staff	24 hrs	1.5 days	Staff[200%]	24 hrs	3 days	Staff
FD-Ed	24 hrs	2 days	24 hrs	2 days	Staff[150%]	32 hrs	2 days	Staff[200%]	16 hrs	2 days	Staff


01 Jan '01
S M T W T F S S M
Staff
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Staff[300%]
Staff[300%]
Staff
Staff[300%]
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Staff[150%]
Staff
Staff[150%]
Staff[200%]
Staff[200%]
Staff[200

10m Exploring What We Just Covered

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- 10m to explore the affect of changing assignments
  - Task-Types.mpp a good start point again
  - Examine the resource sheet and resource info
    - Resource names are descriptive

- There will be time to apply these topics in the case study where usage will be more real-world than Task-Types (but not as exhaustive)

Contents: Task Usage & Assignment Sheets

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- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
- Task-Usage and Assignment Sheets
- Summary
- Case-Study

Task-Usage: The Resource Gantt

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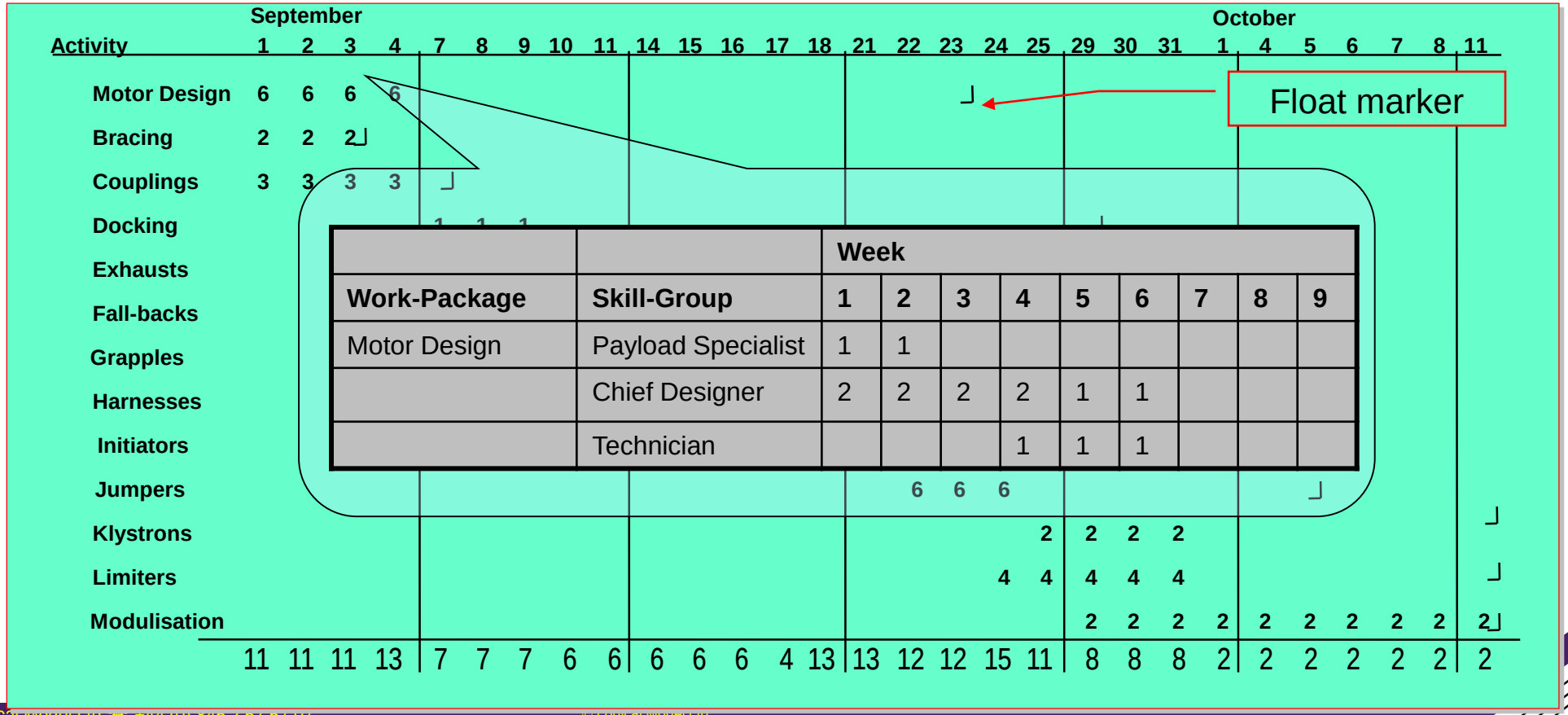
- Shows Level of resource usage over the duration of each activity
  - Important to consider resource's calendar of availability



		Week								
Work-Package	**Skill-Group**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Motor Design	Payload Specialist	1	1							
	Chief Designer	2	2	2	2	1	1			
	Technician				1	1	1			

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Tune Assignments Via An Assignment Sheet

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- The 2 *Usage* sheets give fine control over assigning resources to tasks in specific time-periods
- *Task Usage* and *Resource Usage*
  - Differ only in the grouping displayed

Task Usage

	Task Name	Work	Details	-1	1	2	3	4	5	6	7	8	9	10	11	12
0	Lunar Imaging Syste	5,440 hrs	Work		40h	80h	200h	200h	240h	200h	160h	160h	240h	240h	200h	160h
			Cum. W		40h	120h	320h	520h	760h	960h	1,120h	1,280h	1,520h	1,760h	1,960h	2,120h
			Base.		40h	80h	200h	200h	240h	200h	160h	160h	240h	240h	200h	160h
1	Start-MS	0 hrs	Work													
			Cum. W													
			Base.		0h											
2	Outline Design	120 hrs	Work		40h	80h										
			Cum. W		40h	120h	120h	120h	120h	120h	120h	120h	120h	120h	120h	120h
			Base.		40h	80h										
	Optical Eng.	*80 hrs*	Work		40h	40h										
			Cum. W		40h	80h	80h	80h	80h	80h	80h	80h	80h	80h	80h	80h
			Base.		40h	40h										
	Drawing Office	*40 hrs*	Work		0h	40h										
			Cum. W		0h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h
			Base.			40h										
3	Optics Sub-System	1,200 hrs	Work				40h	40h	40h	40h	40h	40h	80h	80h	40h	40h
			Cum. W				40h	80h	120h	160h	200h	240h	320h	400h	440h	480h
			Base.				40h	40h	40h	40h	40h	40h	80h	80h	40h	40h

Resource Usage

		Resource Name	Work	Details	1	2	3	4	5	6	7	8	9
		Unassigned	0 hrs	Work									
				Cum. W									
1		Optical Eng.	1,120 hrs	Work	40h	40h	160h	160h	160h	120h	80h	80h	
				Cum. W	40h	80h	240h	400h	560h	680h	760h	840h	
		Outline Design	*80 hrs*	Work	40h	40h							
				Cum. W	40h	80h	80h	80h	80h	8			
		Optics design	*320 hrs*	Work			40h	40h	40h	4			
				Cum. W			40h	80h	120h	16			
		Lens Sys Param	*40 hrs*	Work									
				Cum. W									
		Casing design	*280 hrs*	Work			40h	40h	40h	4			
				Cum. W			40h	80h	120h	16			
		Design Laser R	*160 hrs*	Work			40h	40h	40h	4			
				Cum. W			40h	80h	120h	16			
		Purchase Laser	*120 hrs*	Work									

Detail Styles...
- [x] Work
- [ ] Actual Work
- [x] Cumulative Work
- [ ] Overallocation
- [ ] Cost
- [ ] Remaining Availability

- Probably the ONLY way to get a reliable, traceable, auditable result!

Available Assignment Fields

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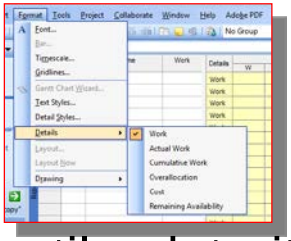
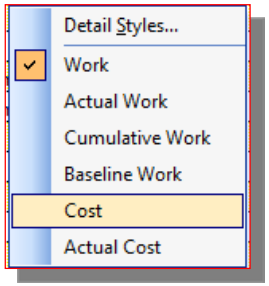
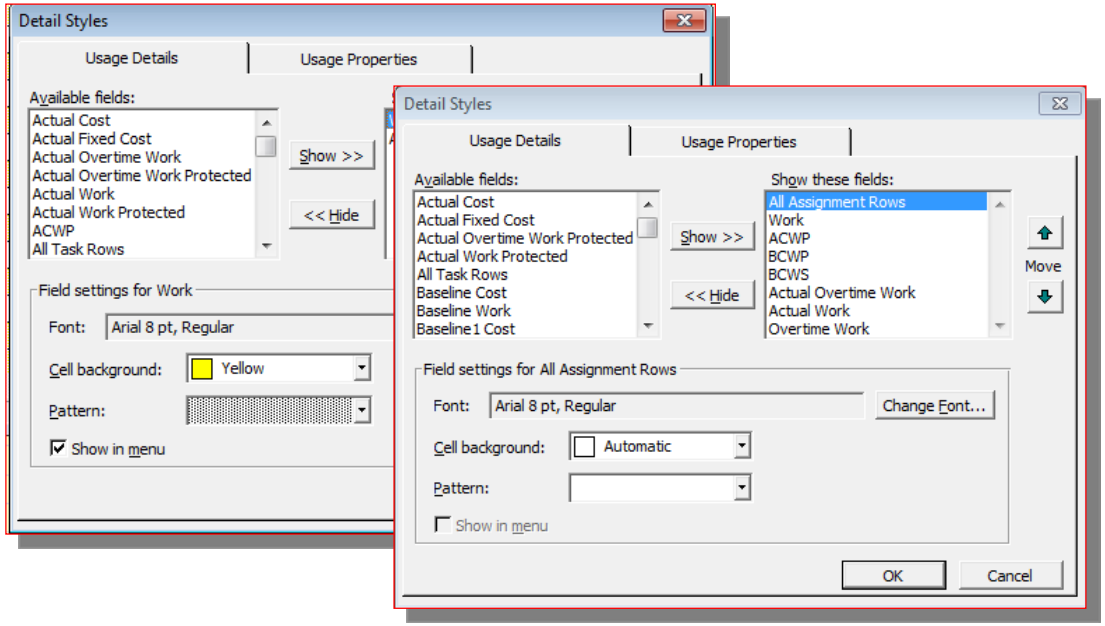
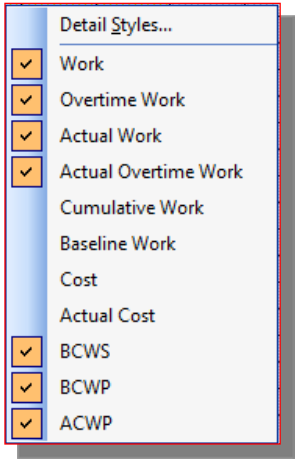
- Right-click for a Quick menu of fields to display
  - Or use *Format* | *Details*
- Select *Detail Styles*… for extensive selection
  - Extends the quick menu until a data-item is de-selected









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Usage Views Focus To The Minute

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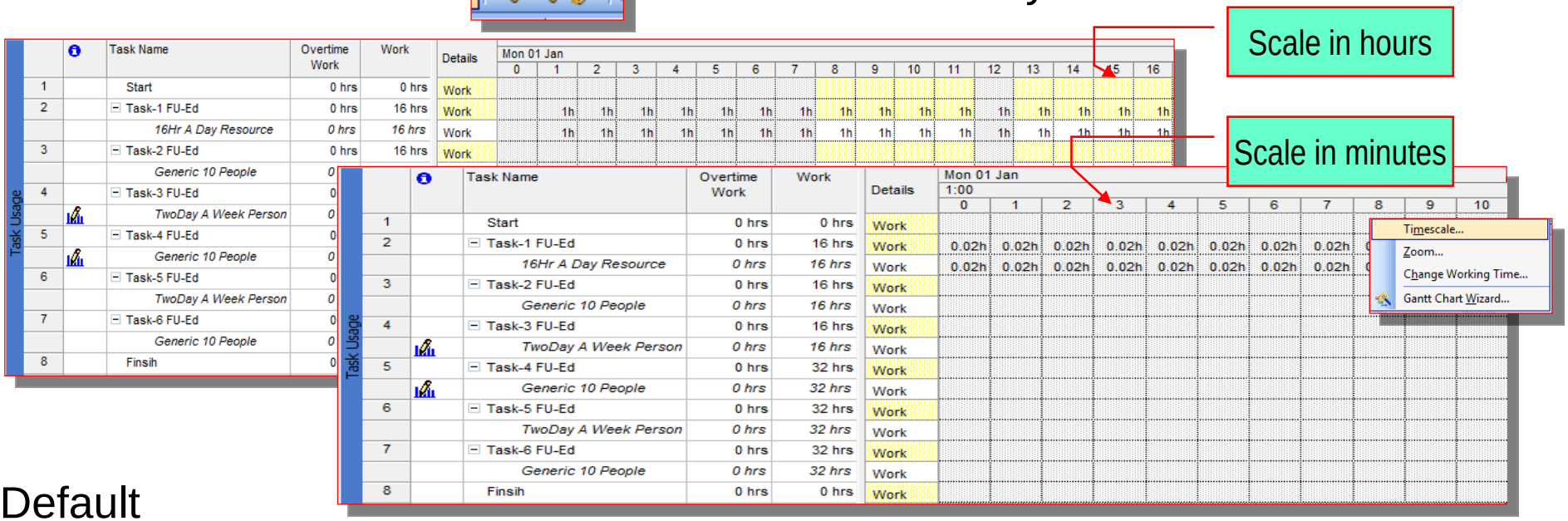
- Zoom with the toolbar or to the minute by hand



- Default
  Non-working time in grey
  - Summary data in yellow
  - (Some) Data in white is editable at some times
    - E.g. Cost when a task is 100% complete or MSPJ cost calculation turned off

Using the Usage Views

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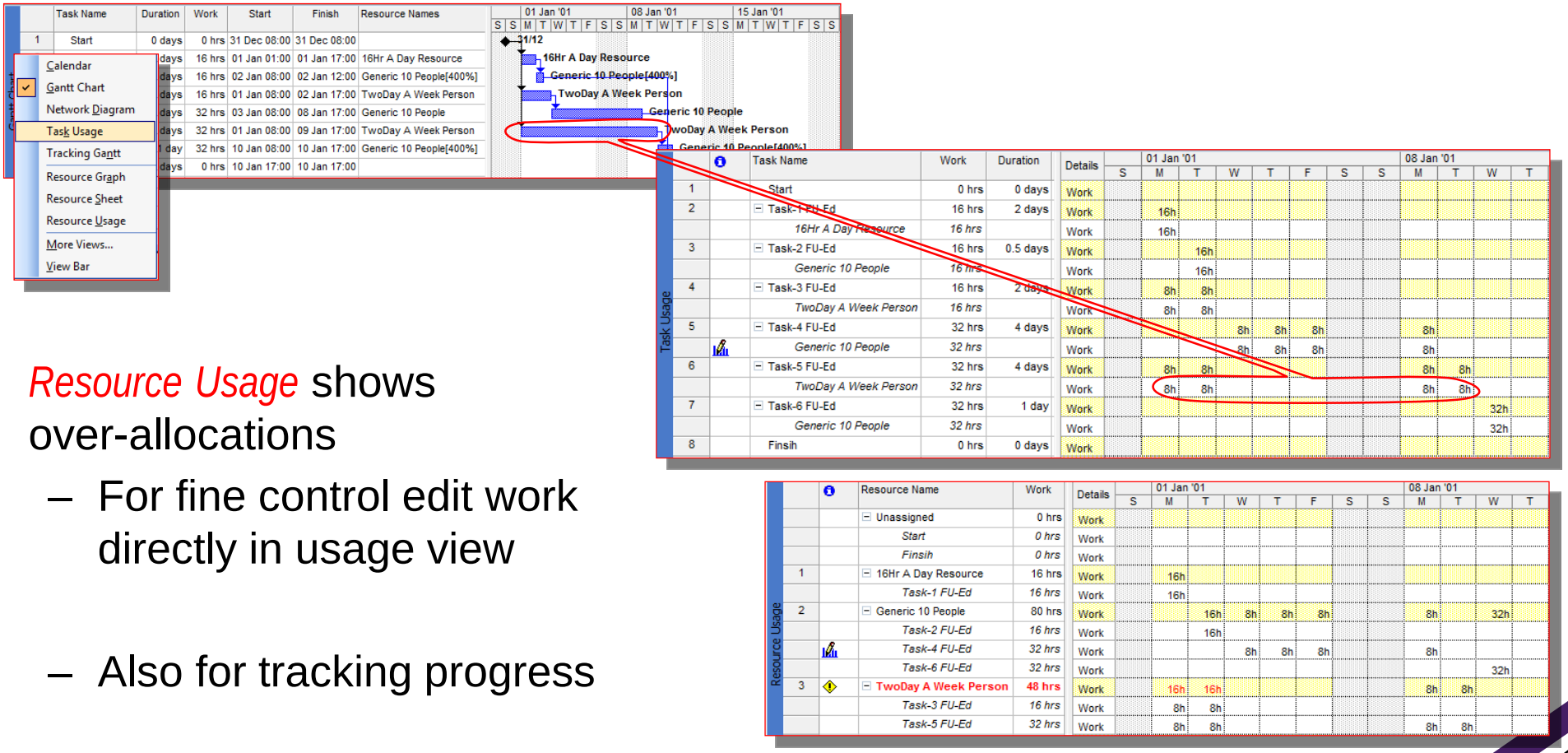
- Gantt bars are a summary of earliest and latest actual assignment data



- *Resource Usage* shows over-allocations
  - For fine control edit work directly in usage view
  - Also for tracking progress

Editing Assignments In Usage View

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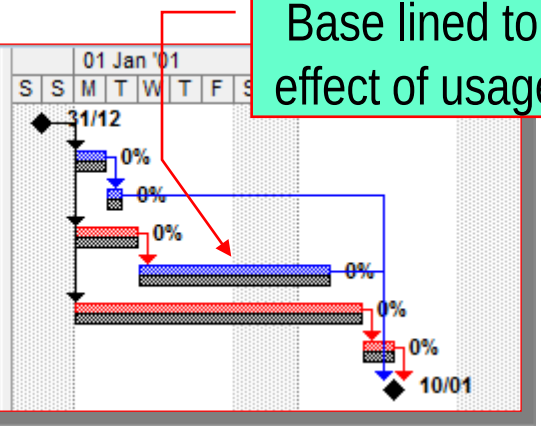
- Start point

Tracking Gantt

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Start	0 days	0 hrs	31 Dec 08:00	31 Dec 08:00	
2	Task-1 FU-Ed	2 days	16 hrs	01 Jan 01:00	01 Jan 17:00	16Hr A Day Resource
3	Task-2 FU-Ed	0.5 days	16 hrs	02 Jan 08:00	02 Jan 12:00	Generic 10 People[400%]
4	Task-3 FU-Ed	2 days	16 hrs	01 Jan 08:00	02 Jan 17:00	TwoDay A Week Person
5	Task-4 FU-Ed	4 days	32 hrs	03 Jan 08:00	08 Jan 17:00	Generic 10 People
6	Task-5 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person
7	Task-6 FU-Ed	1 day	32 hrs	10 Jan 08:00	10 Jan 17:00	Generic 10 People[400%]
8	Finsih	0 days	0 hrs	10 Jan 17:00	10 Jan 17:00	



Base lined to show effect of usage edits

Task Usage

		Task Name	Overtime Work	Work	Details	01 Jan '01 S	M	T	W	T	F	S	S	08 Jan '01 M	T	W	T
1		Start	0 hrs	0 hrs	Work												
2		Task-1 FU-Ed	0 hrs	16 hrs	Work		16h										
		16Hr A Day Resource	*0 hrs*	*16 hrs*	Work		16h										
3		Task-2 FU-Ed	0 hrs	16 hrs	Work			16h									
		Generic 10 People	*0 hrs*	*16 hrs*	Work			16h									
4		Task-3 FU-Ed	0 hrs	16 hrs	Work		8h	8h									
		TwoDay A Week Person	*0 hrs*	*16 hrs*	Work		8h	8h									
5		Task-4 FU-Ed	0 hrs	32 hrs	Work				8h	8h	8h			8h			
		Generic 10 People	*0 hrs*	*32 hrs*	Work				8h	8h	8h			8h			
6		Task-5 FU-Ed	0 hrs	32 hrs	Work		8h	8h						8h	8h		
		TwoDay A Week Person	*0 hrs*	*32 hrs*	Work		8h	8h						8h	8h		
7		Task-6 FU-Ed	0 hrs	32 hrs	Work											32h	
		Generic 10 People	*0 hrs*	*32 hrs*	Work											32h	
8		Finsih	0 hrs	0 hrs	Work												

Affect Of Edits 1/3

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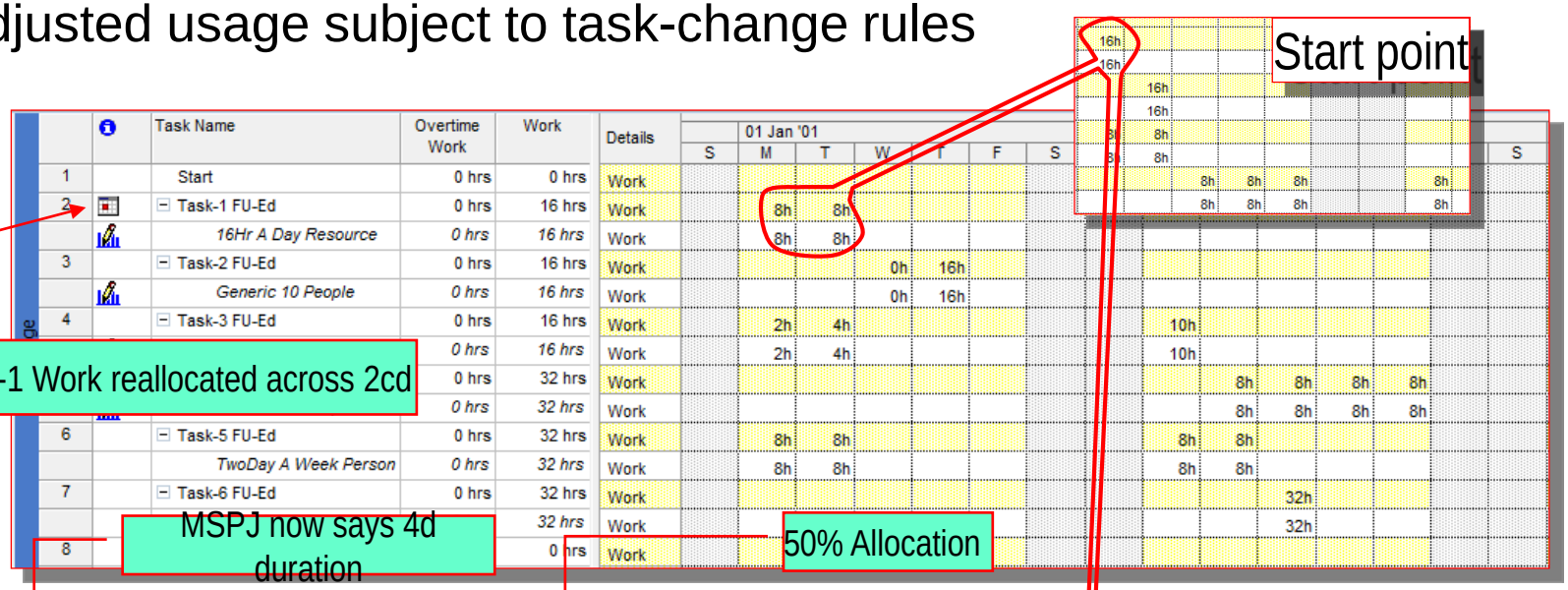
- Manually adjusted usage subject to task-change rules
- Dependencies are honoured
- Not possible to assign work to 2Day Person on their off-days



	Task Name	Duration	Work	Start	Finish	Resource Names
1	Start	0 days	0 hrs	31 Dec 08:00	31 Dec 08:00	
2	Task-1 FU-Ed	4 days	16 hrs	01 Jan 01:00	02 Jan 17:00	16Hr A Day Resource[50%]
3	Task-2 FU-Ed	1 day	16 hrs	03 Jan 08:00	04 Jan 17:00	Generic 10 People[200%]
4	Task-3 FU-Ed	3 days	16 hrs	01 Jan 08:00	08 Jan 17:00	TwoDay A Week Person[125%]
5	Task-4 FU-Ed	4 days	32 hrs	09 Jan 08:00	12 Jan 17:00	Generic 10 People
6	Task-5 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person
7	Task-6 FU-Ed	1 day	32 hrs	10 Jan 08:00	10 Jan 17:00	Generic 10 People[400%]
8	Finsih	0 days	0 hrs	12 Jan 17:00	12 Jan 17:00	

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Affect Of Edits 2/3

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- Dependencies are honoured
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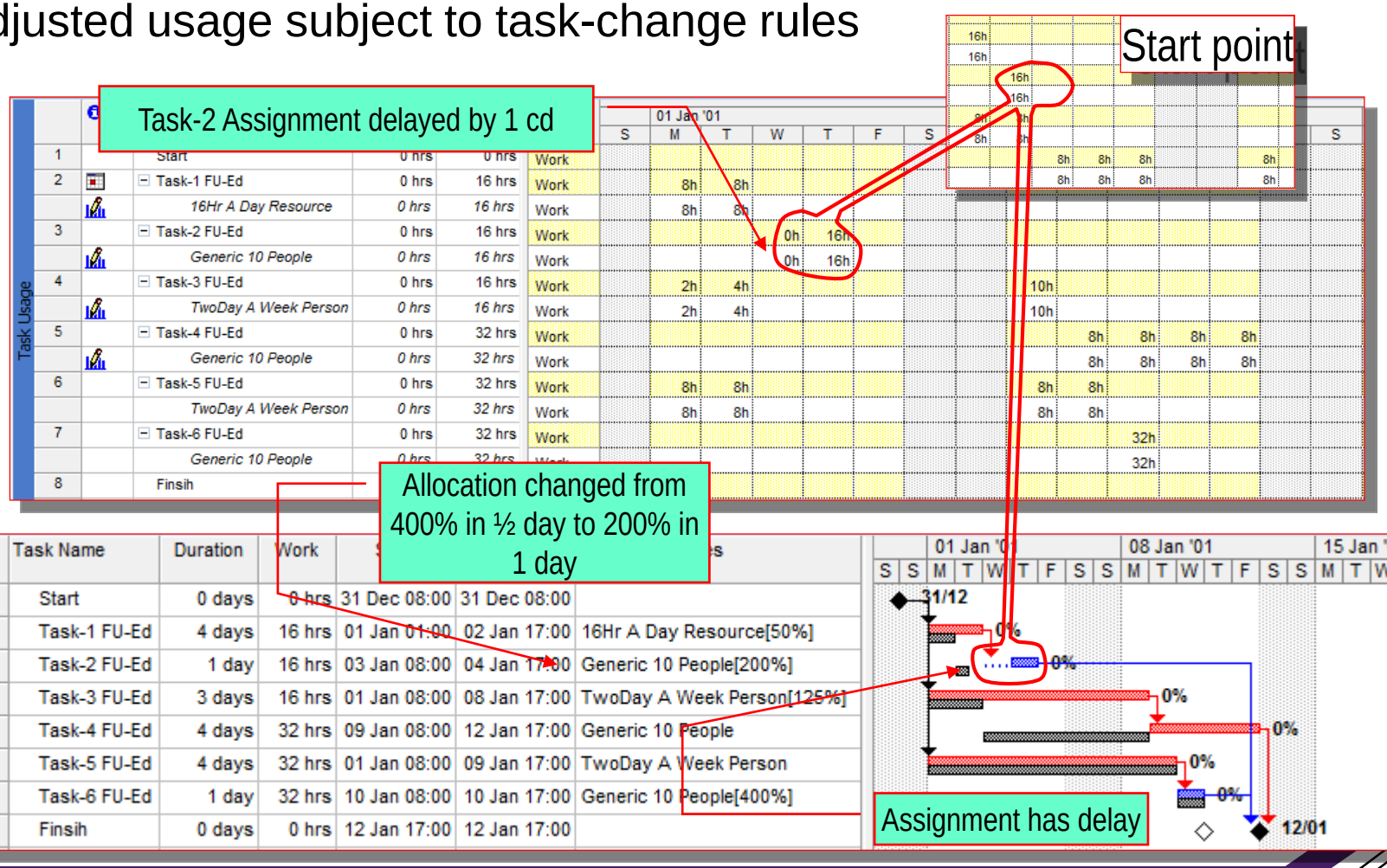

	Task Name	Duration	Work	Start	Finish	Resource Names
1	Start	0 days	0 hrs	31 Dec 08:00	31 Dec 08:00	
2	Task-1 FU-Ed	4 days	16 hrs	01 Jan 01:00	02 Jan 17:00	16Hr A Day Resource[50%]
3	Task-2 FU-Ed	1 day	16 hrs	03 Jan 08:00	04 Jan 17:00	Generic 10 People[200%]
4	Task-3 FU-Ed	3 days	16 hrs	01 Jan 08:00	08 Jan 17:00	TwoDay A Week Person[125%]
5	Task-4 FU-Ed	4 days	32 hrs	09 Jan 08:00	12 Jan 17:00	Generic 10 People
6	Task-5 FU-Ed	4 days	32 hrs	01 Jan 08:00	09 Jan 17:00	TwoDay A Week Person
7	Task-6 FU-Ed	1 day	32 hrs	10 Jan 08:00	10 Jan 17:00	Generic 10 People[400%]
8	Finsih	0 days	0 hrs	12 Jan 17:00	12 Jan 17:00	

Affect Of Edits 3/3

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- Manually adjusted usage subject to task-change rules
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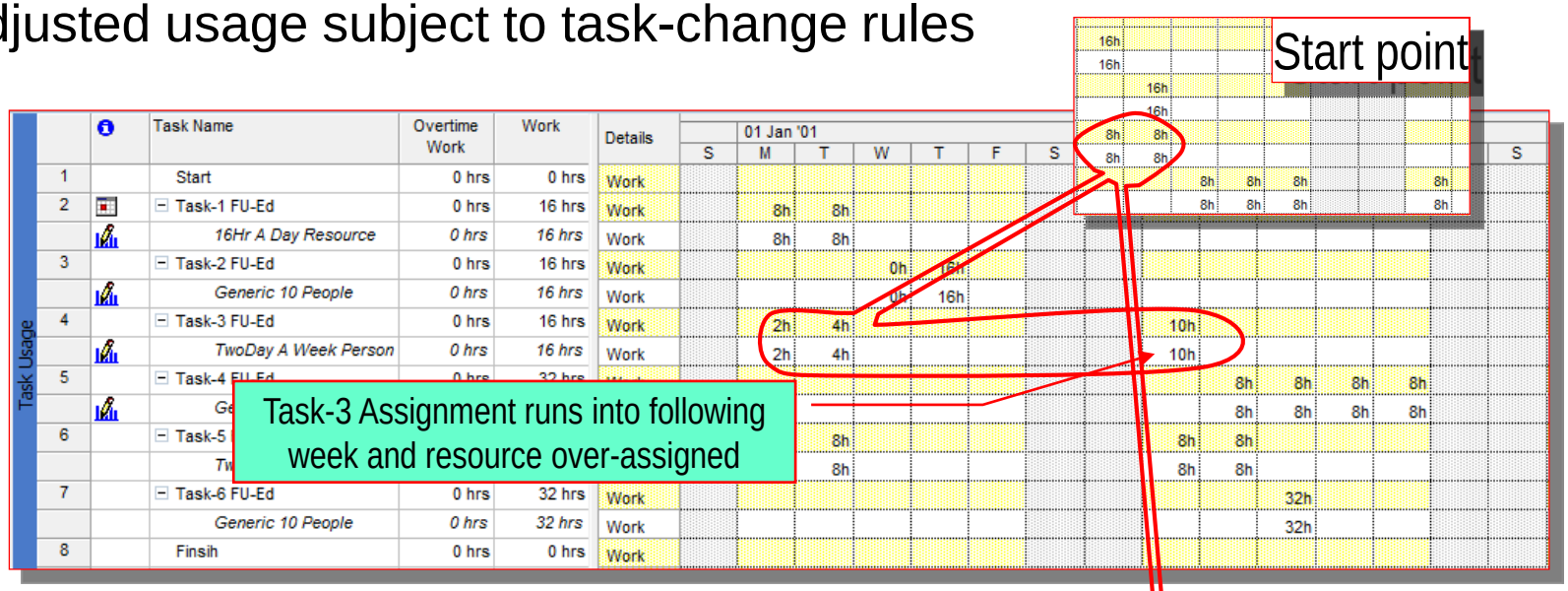
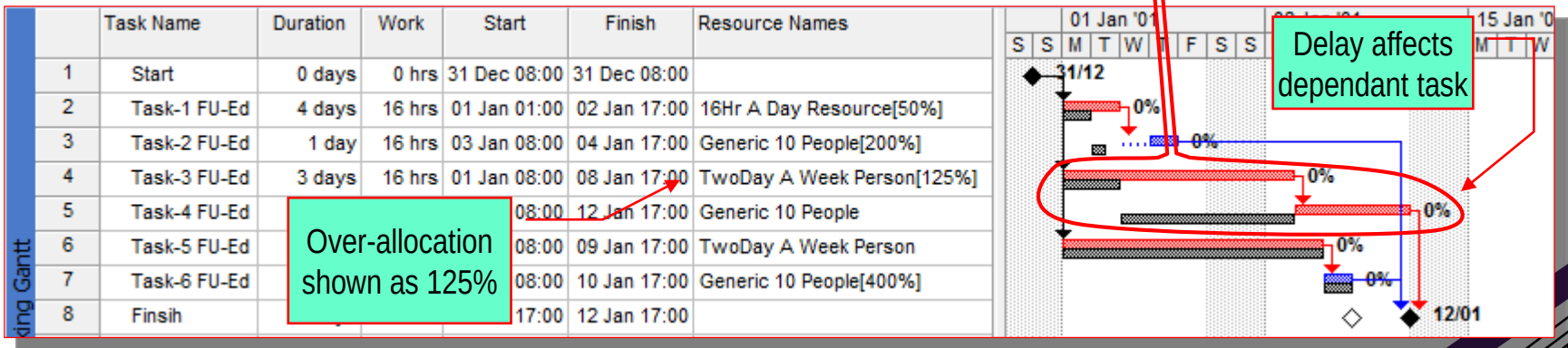
- Not possible to assign work to 2Day Person on their off-days





Usage View Often Used in Split-Screen Views

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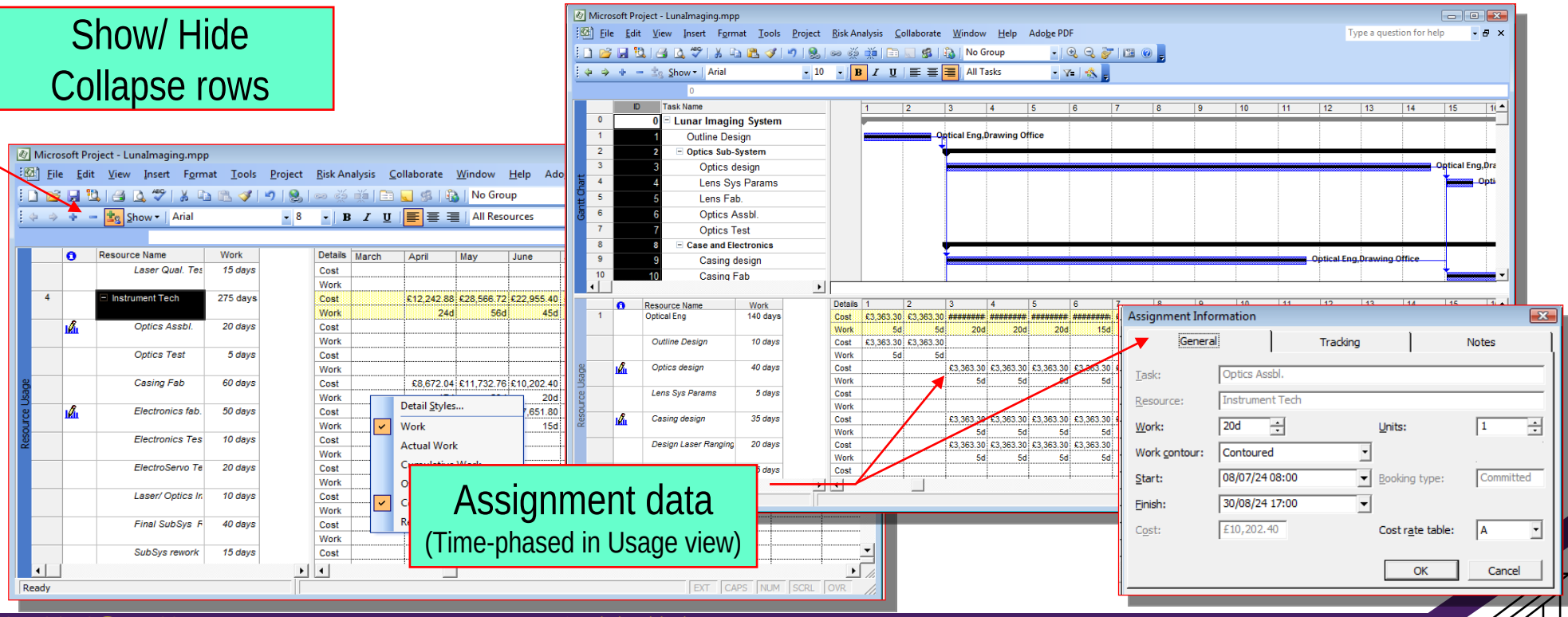
- When used in “split-screen” the bottom pane gives details of item selected in the top pane – Suitable for levelling & smoothing resource loads

Show/ Hide
Collapse rows



Assignment data
(Time-phased in Usage view)

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Contents: End of Chapter! And Case

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- Resource Pools
- Assigning Resources
  - Task Type, Initial Assignments and Initial Scheduling
  - Time to explore concepts just covered
- Fixed Duration and Fixed Units ± Effort Driven
  - Time to explore concepts just covered
- Task-Usage and Assignment Sheets
- Summary
- Case-Study

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Summary

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- Product definitions define development skills and lead to task definitions and links to the company QMS of standards and procedures
  - Schedule development needs defined resources MSPJ uses Resource Pools
- Assignment of resources to tasks defines the work content and vice-versa
  - Any calculation scheme will make assumptions
  - Results will sometimes be correct
  - Assignment Sheets are the best view with which to correct the details
- Data can be entered (and tracked) consistently at any level
  - Task-Type must be set correctly (or MSPJ calculations disabled)
- *Establishing the baseline is tricky if you do not understand the internal mechanics*
- All elements of data can be imported

Case-Study: Resource Assignments

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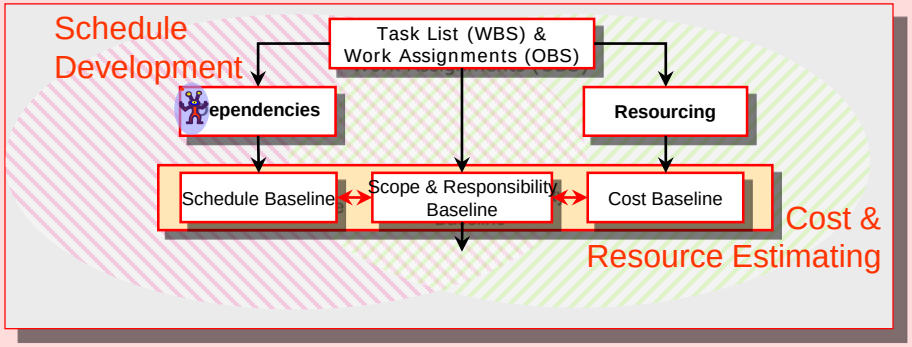
- Starting where the last Case-Study stopped (Case-2 With Links.mpp)
  - Set task durations from the details on the next slide
    or extract and apply from Case Task Info.txt (either way SAVE when done)
  - Import resources* from Case-Resources.txt or link to Case-ResPool.mpp
    - Try one then restart on saved file with the other: proceed to next steps with one
- The assignment of resources to tasks is noted a few slides ahead
  - (Or can be 'cut-n-pasted' from the Case Task Info text file)
  - Assign resources to tasks
    - MSPJ's calculations of 'Work' will NOT be the required working pattern
  - Use the *Task-Usage* view to make the assignments described in the text



- Case-3.3 CorrectAssignments.mpp is the required solution

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* Or manually enter – details on following slides

Case-Study: The Resources

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Name	Type	Initials	Max_Units	Standard Rate
• Optical Eng.	Work	Eng-O	4	£3,363.30/wk†
• Drawing Office	Work	DrO	2	£2,550.60/wk
• SubCon	Work	S-C	0	£3,000.00/wk
– Available after week 17				
• Instrument Tech	Work	Tech-I	3	£2,550.60/wk†
• Electrical Eng.	Work	Eng-E	1	£3,363.30/wk
• Fabr'tn Dept	Work	Fab	1	£3,363.30/wk

† Limited availability due to holiday commitments – details not currently known

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Case-Study: Task Durations

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Sub-system	Full Name	Dur'tn
Lunar Imaging System		
	Start-MS	0 days
	Outline Design	2 wks
Optics Sub-System		
	Optics Design	12 wks
	Lens System Parameters	1 wk
	Lens Fabrication	10 wks
	Optics Assembly	4 wks
	Optics Test	1 wk
Focusing Mechanics Ss		
	Focusing Mechanics Design	9 wks
	Focusing Mechanics (Purchase)	12 wks
Electronics Ss		
	Electronics Design	14 wks
	Electronics Fabrication	10 wks
	Electronics Test	2 wks
	ElectroServo Preparation for Integration	4 wks

Sub-system	Full Name	Dur'tn
Laser RangeFinder Ss		
	Laser Ranging System Tender	4 wks
	Laser Generator (Purchase)	3 wks
	Laser Fabrication	3 wks
	Laser Preparation for Integration	2 wks
Image Buffer XSO		
	Image Storage Design	4 wks
	Image Store Fabrication	12 wks
	Image Store As-Built Drawings	1 wk
	XSO Assembly	8 wks
	XSO Review	3 wks
Intg'tn & Proving Phase		
	Assemble Sub-Systems	2 wks
	System Test	4 wks
	Accept Test	2 wks
	Field Installation & Calibration	1 wk
	Finish-MS	0 days

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Case-Study: Assignments Partial Solutions

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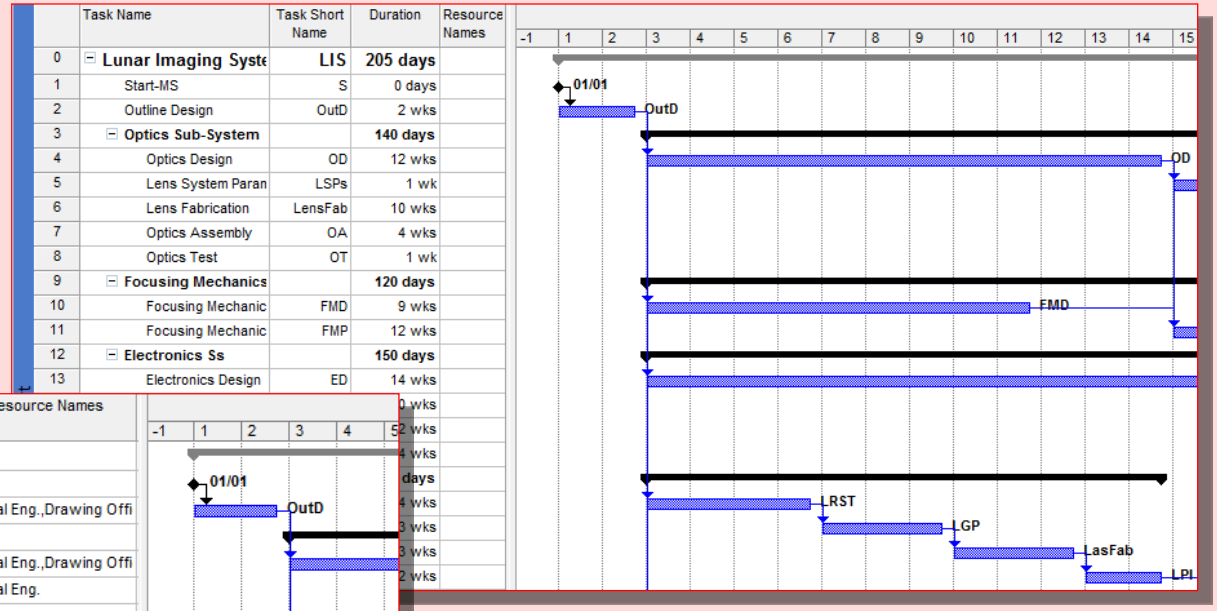
- Case-2 With Links after addition of task durations
  (Case-3.1 Durations & Resources Loaded)

When Initial Assignments are made you should match these (wrong) values!



	Task Name	Task Short Name	Duration	Resource Names
0	Lunar Imaging Syste	LIS	205 days	
1	Start-MS	S	0 days	
2	Outline Design	OutD	2 wks	
3	Optics Sub-System		140 days	
4	Optics Design	OD	12 wks	
5	Lens System Paran	LSPs	1 wk	
6	Lens Fabrication	LensFab	10 wks	
7	Optics Assembly	OA	4 wks	
8	Optics Test	OT	1 wk	
9	Focusing Mechanics		120 days	
10	Focusing Mechanic	FMD	9 wks	
11	Focusing Mechanic	FMP	12 wks	
12	Electronics Ss		150 days	
13	Electronics Design	ED	14 wks	

Gantt Chart

WBS	Name	Duration	Cost	Work	Resource Names
0	**Lunar Imaging System**	**205 days**	**£491,569.50**	**6,840 hrs**	
1	Start-MS	0 days	£0.00	0 hrs	
2	Outline Design	2 wks	£11,827.80	160 hrs	Optical Eng.,Drawing Offi
3	**Optics Sub-System**	**140 days**	**£117,083.10**	**1,600 hrs**	
3.1	Optics Design	12 wks	£70,966.80	960 hrs	Optical Eng.,Drawing Offi
3.2	Lens System Parameters	1 wk	£3,363.30	40 hrs	Optical Eng.
3.3	Lens Fabrication	10 wks	£30,000.00	400 hrs	SubCon
3.4	Optics Assembly	4 wks	£10,202.40	160 hrs	Instrument Tech
3.5	Optics Test	1 wk	£2,550.60	40 hrs	Instrument Tech
4	**Focusing Mechanics Ss**	**120 days**	**£83,832.30**	**1,200 hrs**	
4.1	Focusing Mechanics Design	9 wks	£53,225.10	720 hrs	Optical Eng.,Drawing Offi
4.2	Focusing Mechanics (Purchase)	12 wks	£30,607.20	480 hrs	Instrument Tech
5	**Electronics Ss**	**150 days**	**£123,604.20**	**1,760 hrs**	
5.1	Electronics Design	14 wks	£82,794.60	1,120 hrs	Electrical Eng.,Drawing O
5.2	Electronics Fabrication	10 wks	£25,506.00	400 hrs	Instrument Tech

- Case-3.2 InitialWrongAssignments

Case-Study: Correcting The Assign Of Resources To Activities 1/4

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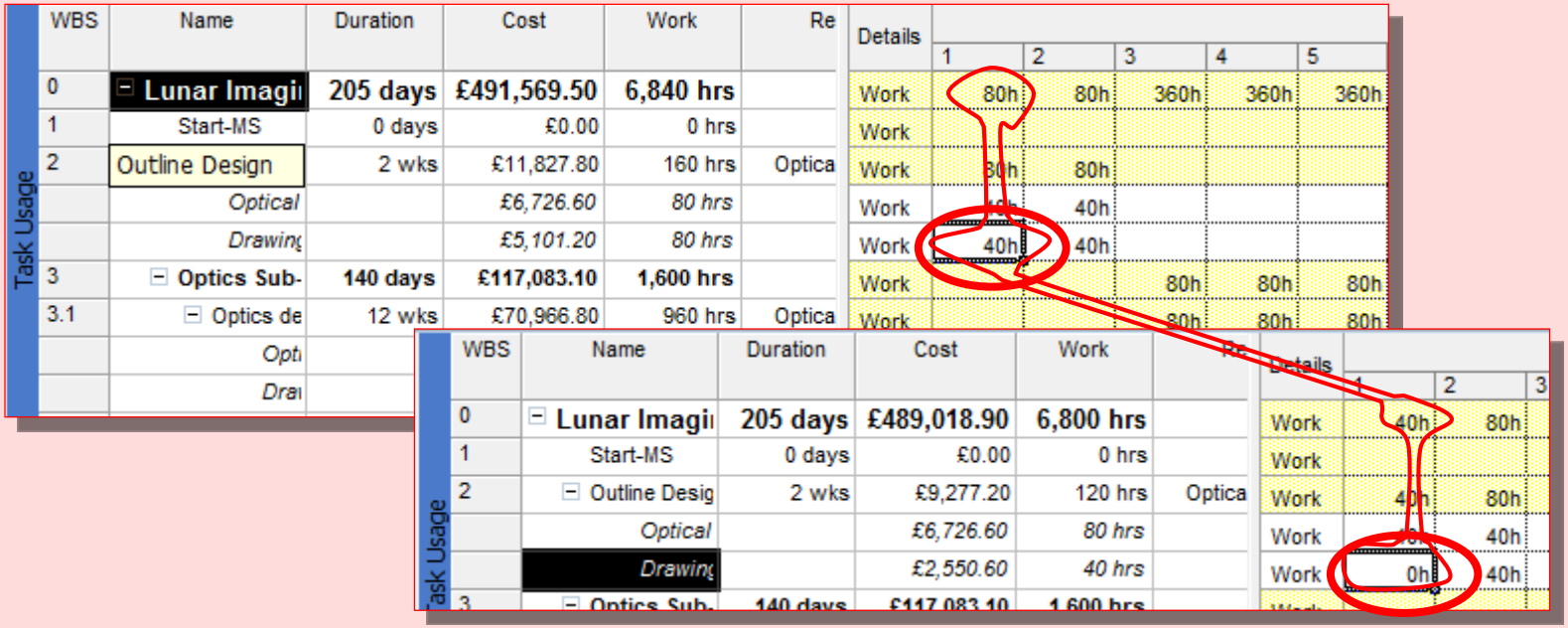
- The Outline Design (OutD) activity will be the responsibility of the lead Optical Engineer (Eng-O) who will be involved for both weeks of the design effort.
  - The involvement of the Drawing Office (DrO), to create drawings will only occur in the 2nd week of the task (Try delete then undo & Set wk 1 to zero)

- View | Task Usage



Case-Study: Correcting The Assign Of Resources To Activities 2/4

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- After the completion of the Outline Design (OutD) task, there are 5 simultaneous activities that begin
  - The first is the 12 week Optics Design (OD). OD will require the services of an Optical Engineer (Eng-O) for the first 2/3rds of the allotted time. The Drawing Office (DrO) will be involved for the last 50% of the time i.e. they will overlap for 2 weeks.
  - FMD will also require an Eng-O. For the first 7 or its 9 weeks of the effort. The DrO will work for the last 3 weeks i.e. there is a 1 week overlap.
  - The Electronics Design (ED) will be under the direction of an Electrical Engineer (Eng-E), who will be involved for the first 12 of the 14 weeks
    - The DrO will create drawings in the task's last 3 weeks.
  - An Eng-O will write the proposal and conduct the Laser Ranging System Tender (LRST). They will also complete the tender process in Laser Generator (Purchase) (LGP) activity
  - The Image Storage Design (ISD) will require an Eng-O for the first 3 of the 4 wks duration. The DrO will be used for the last 2 weeks

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Case-Study: Correcting Assignment Of Resources To Activities 3/4

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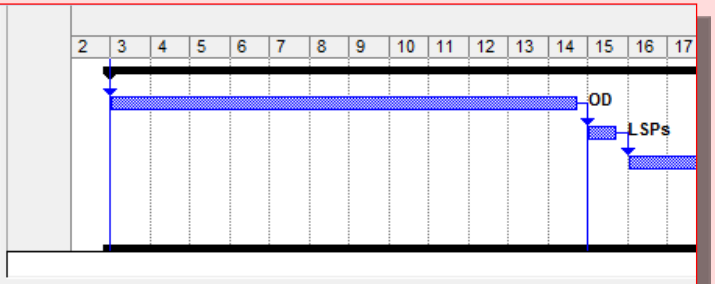
- Within Optics
  - Lens System Parameters (LSPs) activity will require an Eng-O full time
  - Lens Fabrication will be sub contracted (S-C)

Gantt Chart

WBS	ID	Name	Text30	Duration	Cost	Work	Resource Names
3	3	**Optics Sub-System**		**140 days**	**£88,326.30**	**1,200 hrs**	
3.1	4	Optics Design	OD	12 wks	£42,210.00	560 hrs	Optical Eng.,Drawing Office
3.2	5	Lens System Para	LSPs	1 wk	£3,363.30	40 hrs	Optical Eng.
3.3	6	Lens Fabrication	LensFab	10 wks	£30,000.00	400 hrs	SubCon
3.4	7	Optics Assembly	OA	4 wks	£10,202.40	160 hrs	Instrument Tech
3.5	8	Optics Test	OT	1 wk	£2,550.60	40 hrs	Instrument Tech



Task Usage

WBS	ID	Name	Text30	Duration	Cost	Work	Resource Names	Details	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
3.1	4	Optics Design	OD	12 wks	£42,210.00	560 hrs	Optical Eng.,Drawing Office	Work		40h	40h	40h	40h	40h	40h	80h	80h	40h	40h	40h	40h			
	1	*Optical Eng.*			*£26,906.40*	*320 hrs*	*Optical Eng.*	Work		40h	40h	40h	40h	40h	40h	40h	40h							
	2	*Drawing Office*			*£15,303.60*	*240 hrs*	*Drawing Office*	Work		0h	0h	0h	0h	0h	0h	40h	40h	40h	40h	40h	40h			
3.2	5	Lens System Parameters	LSPs	1 wk	£3,363.30	40 hrs	Optical Eng.	Work														40h		
	1	*Optical Eng.*			*£3,363.30*	*40 hrs*	*Optical Eng.*	Work														40h		
3.3	6	Lens Fabrication	LensFab	10 wks	£30,000.00	400 hrs	SubCon	Work															40h	40
	3	*SubCon*			*£30,000.00*	*400 hrs*	*SubCon*	Work															40h	40
3.4	7	Optics Assembly	OA	4 wks	£10,202.40	160 hrs	Instrument Tech	Work																
	4	*Instrument Tech*			*£10,202.40*	*160 hrs*	*Instrument Tech*	Work																
3.5	8	Optics Test	OT	1 wk	£2,550.60	40 hrs	Instrument Tech	Work																
	4	*Instrument Tech*			*£2,550.60*	*40 hrs*	*Instrument Tech*	Work																

  - The Optics Assembly (OA) and Optics Test (OT) are both assigned to Instrument Technicians (Tech-I)

Case-Study: Correcting Assignment Of Resources To Activities 4/4

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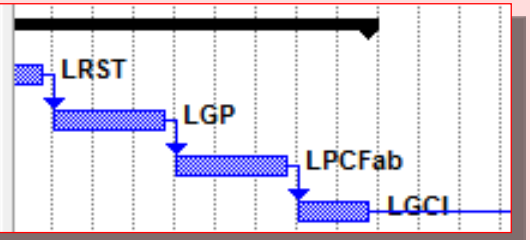
- Within Electronics a full-time Tech-I is assigned to each of EFab, ET and ESI
- After the Laser Range Finder Tender and Laser Generator (Purchase) activities the sub contractor will fabricate Laser Positioning Controls (LPCFab T-20) and a Tech-I will carry out Laser Generator and Controls Integration (LGCI T-21) ready for System Integration – these tasks have been poorly named up to now
  - Update Task name & Short name to reflect clearer task description

Laser RangeFinder Ss		60 days	£37,644.30	480 hrs
Laser Ranging System Tender	LRST	4 wks	£13,453.20	160 hrs
Laser Generator (Purchase)	LGP	3 wks	£10,089.90	120 hrs
Laser Positioning Controls Fabrication	LPCFab	3 wks	£9,000.00	120 hrs
Generator & Controls Integration	LGCI	2 wks	£5,101.20	80 hrs



- The Image Store will be fabricated in-house (ISFab will be conducted by Fabr'tn Dept) with drawings created by DrO after Fabr'tn have built a working storage module
  - The XSO will be assembled and reviewed by Tech-I's
- All activity in the Integration and Proving phase is assigned to Tech-I staff

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Case-Study: The Correct Resource Assignments

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- Case-3 Correct Assignments
  - (partial view of) Target assignments after correcting assignments

Task Usage

WBS	ID	Name	Details	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
0	0	**Lunar Imaging System**	Work	40h	80h	200h	200h	240h	200h	200h	200h	280h	240h	200h	160h	160h	200h	160h	160h	160h	160h	160h	160h	160h	160h	160h	160h	160h	160h	120h	120h	120h	120h	40h	40h
1	1	Start-MS	Work																																
2	2	Outline Design	Work	40h	80h																														
	1	*Optical Eng.*	Work	40h	40h																														
	2	*Drawing Office*	Work	0h	40h																														
3	3	**Optics Sub-System**	Work			40h	40h	40h	40h	40h	40h	80h	80h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h		
3.1	4	Optics Design	Work			40h	40h	40h	40h	40h	40h	80h	80h	40h	40h	40h	40h																		
	1	*Optical Eng.*	Work			40h	40h	40h	40h	40h	40h	40h	40h																						
	2	*Drawing Office*	Work			0h	0h	0h	0h	0h	0h	40h	40h	40h	40h	40h	40h																		
3.2	5	Lens System Parameters	Work															40h																	
	1	*Optical Eng.*	Work															40h																	
3.3	6	Lens Fabrication	Work																40h	40h	40h	40h	40h	40h	40h	40h	40h	40h							
	3	*SubCon*	Work																40h	40h	40h	40h	40h	40h	40h	40h	40h	40h							
3.4	7	Optics Assembly	Work																										40h	40h	40h	40h			
	4	*Instrument Tech*	Work																										40h	40h	40h	40h			
3.5	8	Optics Test	Work																														40h		
	4	*Instrument Tech*	Work																														40h		
4	9	**Focusing Mechanics Ss**	Work			40h	40h	40h	40h	40h	40h	80h	40h	40h				40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h						
4.1	10	Focusing Mechanics Design	Work			40h	40h	40h	40h	40h	40h	80h	40h	40h																					
	1	*Optical Eng.*	Work			40h	40h	40h	40h	40h	40h	40h																							
	2	*Drawing Office*	Work			0h	0h	0h	0h	0h	0h	40h	40h	40h																					
4.2	11	Focusing Mechanics (Purchase	Work															40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h						
	4	*Instrument Tech*	Work															40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h						
5	12	**Electronics Ss**	Work			40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	80h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h
5.1	13	Electronics Design	Work			40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	80h	40h	40h																
	2	*Drawing Office*	Work			0h	0h	0h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h	40h																

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Case-Study: The Correct Task Costs

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- Corrected System, Sub-system and task assignments and names
  - Case-3.3 Correct Assignments.mpp

Gantt Chart

WBS	ID	Name	Duration	Cost	Work	Resource Initials
0	0	**Lunar Imaging System**	**205 days**	**£394,984.20**	**5,440 hrs**	
1	1	Start-MS	0 days	£0.00	0 hrs	
2	2	Outline Design	2 wks	£9,277.20	120 hrs	Eng-O,DrO
3	3	**Optics Sub-System**	**140 days**	**£88,326.30**	**1,200 hrs**	
3.1	4	Optics Design	12 wks	£42,210.00	560 hrs	Eng-O,DrO
3.2	5	Lens System Parameters	1 wk	£3,363.30	40 hrs	Eng-O
3.3	6	Lens Fabrication	10 wks	£30,000.00	400 hrs	S-C
3.4	7	Optics Assembly	4 wks	£10,202.40	160 hrs	Tech-i
3.5	8	Optics Test	1 wk	£2,550.60	40 hrs	Tech-i
4	9	**Focusing Mechanics Ss**	**120 days**	**£61,802.10**	**880 hrs**	
4.1	10	Focusing Mechanics Design	9 wks	£31,194.90	400 hrs	Eng-O,DrO
4.2	11	Focusing Mechanics (Purchase	12 wks	£30,607.20	480 hrs	Tech-i
5	12	**Electronics Ss**	**150 days**	**£88,821.00**	**1,240 hrs**	
5.1	13	Electronics Design	14 wks	£48,011.40	600 hrs	Eng-E,DrO
5.2	14	Electronics Fabrication	10 wks	£25,506.00	400 hrs	Tech-i
5.3	15	Electronics Test	2 wks	£5,101.20	80 hrs	Tech-i
5.4	16	ElectroServo Preparation for Int	4 wks	£10,202.40	160 hrs	Tech-i

Gantt Chart

WBS	ID	Name	Duration	Cost	Work	Resource Initials
6	17	**Laser RangeFinder Ss**	**60 days**	**£37,644.30**	**480 hrs**	
6.1	18	Laser Ranging System Tender	4 wks	£13,453.20	160 hrs	Eng-O
6.2	19	Laser Generator (Purchase)	3 wks	£10,089.90	120 hrs	Eng-O
6.3	20	Laser Positioning Controls Fabri	3 wks	£9,000.00	120 hrs	S-C
6.4	21	Generator & Controls Integratior	2 wks	£5,101.20	80 hrs	Tech-i
7	22	**Image Buffer XSO**	**140 days**	**£86,157.90**	**1,160 hrs**	
7.1	23	Image Storage Design	4 wks	£15,191.10	200 hrs	Eng-O,DrO
7.2	24	Image Store Fabrication	12 wks	£40,359.60	480 hrs	Fab
7.3	25	Image Store As-Built Drawings	1 wk	£2,550.60	40 hrs	DrO
7.4	26	XSO Assembly	8 wks	£20,404.80	320 hrs	Tech-i
7.5	27	XSO Review	3 wks	£7,651.80	120 hrs	Tech-i
8	28	**Intg'tn & Proving Phase**	**45 days**	**£22,955.40**	**360 hrs**	
8.1	29	Assemble Sub-Systems	2 wks	£5,101.20	80 hrs	Tech-i
8.2	30	System Test	4 wks	£10,202.40	160 hrs	Tech-i
8.3	31	Accept Test	2 wks	£5,101.20	80 hrs	Tech-i
8.4	32	Field Installation & Calibration	1 wk	£2,550.60	40 hrs	Tech-i
9	33	Finish-MS	0 days	£0.00	0 hrs	

- Your solution should match these durations and costs!
  - To diagnose errors start at System, then Subsystem then Task

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If you need training, mentoring or assistance with benefits realisation, governance or projects

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- For further help & assistance
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- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 6

Lesson 6: Finalising The Schedule and Presenting the Baseline

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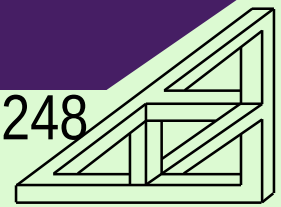

Objectives

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- Consider the factors in creation of the project baselines
  - Balance between the project's constraints and targets
- Turn on display of the critical path
- Find and address resource over and under allocations
  - Manually address allocations
  - Explore the use of auto-levelling
- Reviewing project costs and cash-flows
- Saving and manipulating baselines
- Taking account of risk with 3pt Estimates, PERT and Contingent tasks
  - Monte-Carlo analysis
- Case-Study practice

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Development and Maintenance of Project Baseline

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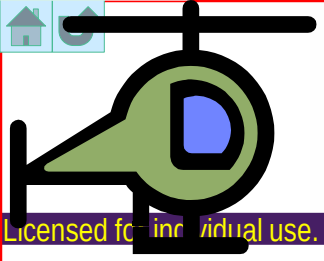

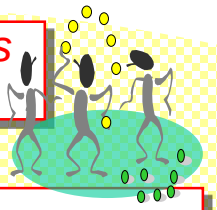

Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

Monitoring, Tracking & Control

The Project Baseline

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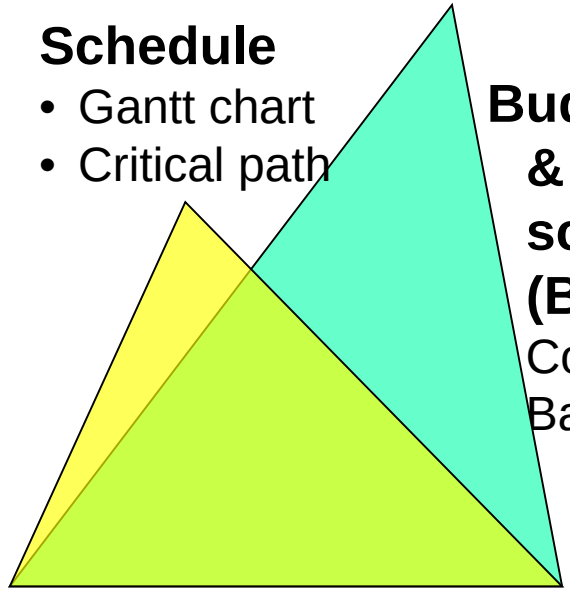
- The Project baseline is an agreed set of **compatible commitments**
  - Scope & Acceptance Criteria
  - Schedule
  - Resource Allocations (Skills, Plant and Money)
- Baseline 'struck' when all in balance
  - After resource allocations finalised
- Change may start in any £, 🕓, or work
  - *Every change will 'ripple' and affect AT LEAST 1 other element*



Baseline elements are inter-dependent: change to one causes change in the others

Reduced time * same scope = more cost

Steps In Building The Baseline

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- Done so far
  - Tasks have been entered and linked in-to dependent sequences
  - Estimated work or durations entered for each task
  - Resources have been applied to the work required
  - Task durations determined

- Still to do
  - Initial critical path displayed
  - Resource over- and under-allocations analysed and resolved
    - Order of analysis is dictated by critical-resource availability and critical-path
  - Project base-lined
  - The project's technical work is then executed… and

    …Progress updates are applied to the plan to reflect work done and not done

Contents: Critical Path & Levelling

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Critical path and levelling

- Cash-flows and cumulative costs
  - Save the baseline
- Adding risk To The baseline

Showing Critical Path On A Gantt View

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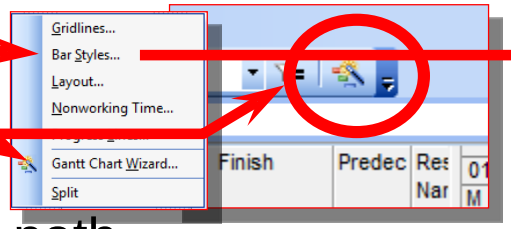
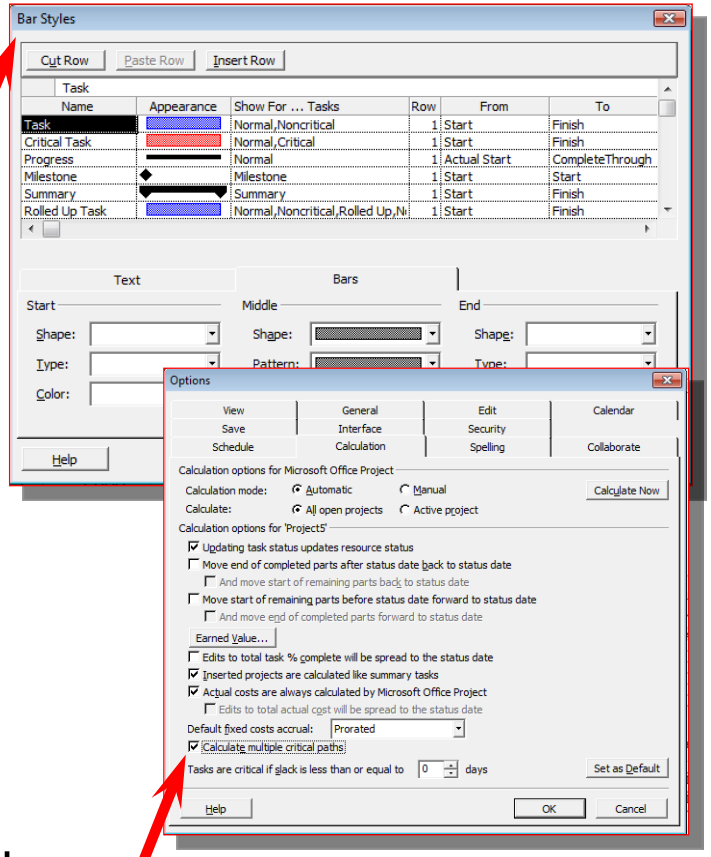
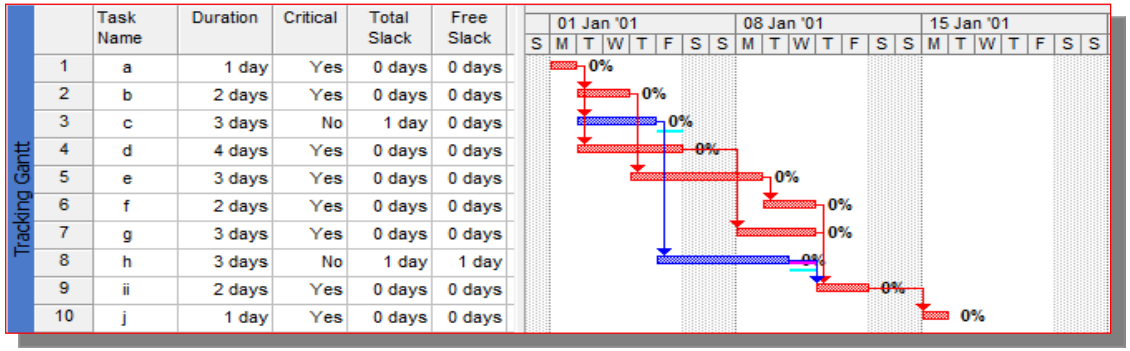
- Turn on display of the Critical Path EG Manually
  - Right-Click the Gantt background
  - Alternatively use the Gantt Wizard





- Easiest way to show critical path is use the Tracking Gantt



- To show a “critical-path” for each sub-network of tasks

Tools | Options | Calculation-Tab | Calculate Multiple Critical Paths

Under and Over-Allocations

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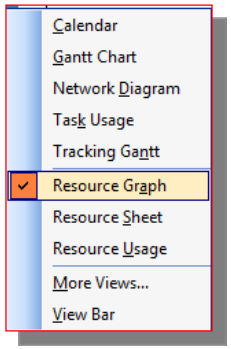
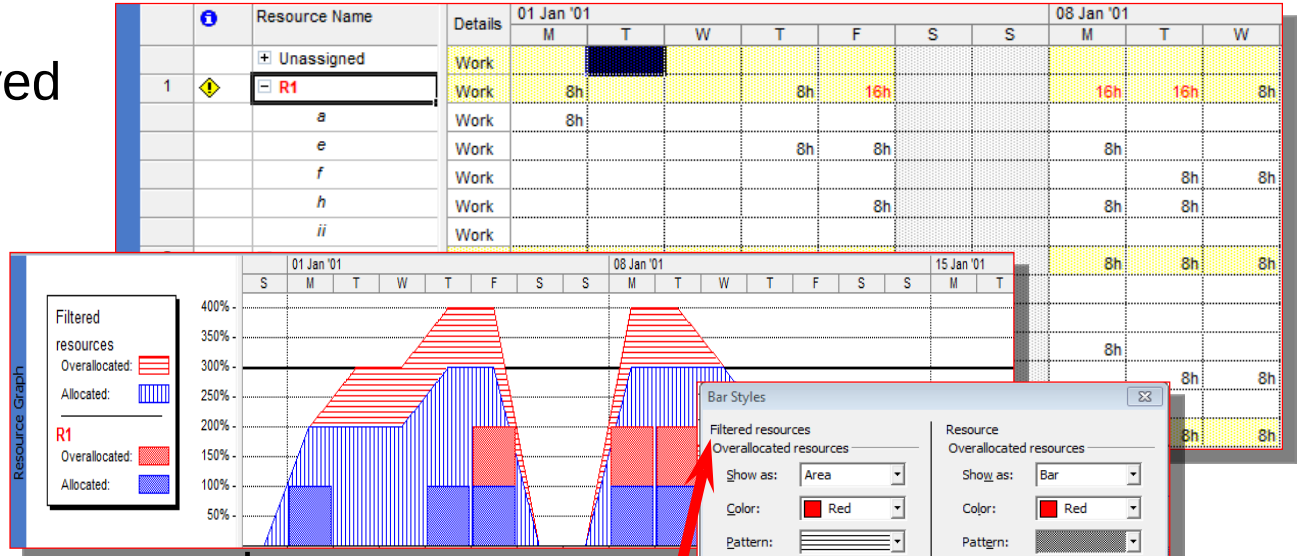
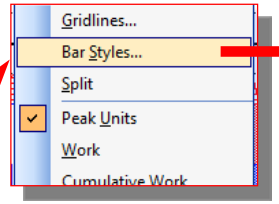
- Over-Allocation means resources are scheduled to work longer than they are available
  - Allocations are displayed in Resource views

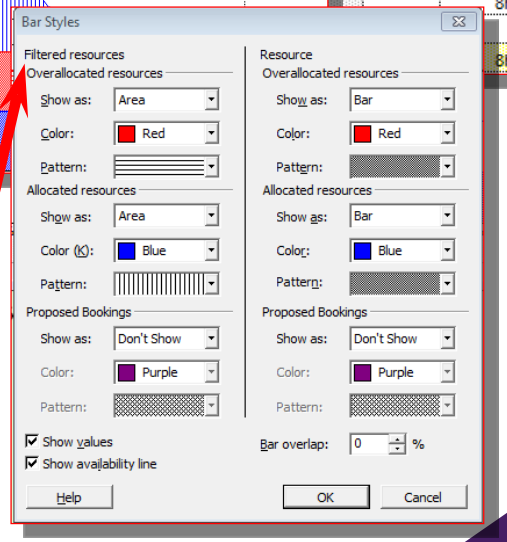




  - Under-allocations may mean project costs are inefficient

- To display aggregate graphs
  - *Right-Click* background
    - Filtered resources "Show as…"





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Finding Allocations

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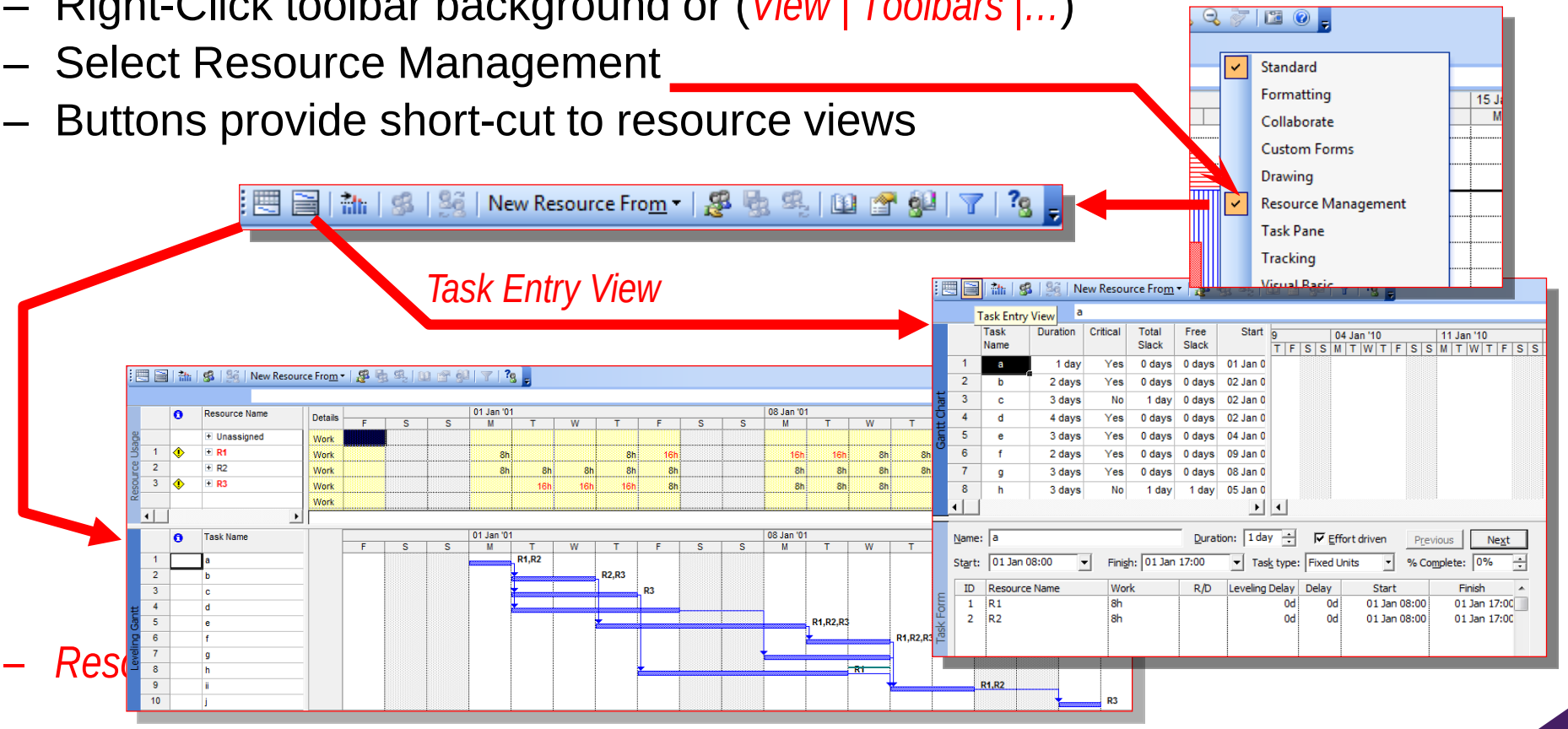
- The Resource Management toolbar is an easy way to analyse resource use
  - Right-Click toolbar background or (*View | Toolbars |...*)
  - Select Resource Management
  - Buttons provide short-cut to resource views
  - *Res*



Levelling By Changing Assignments

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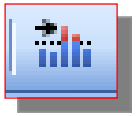
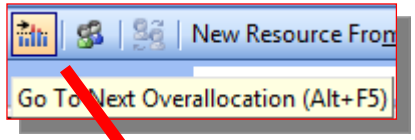
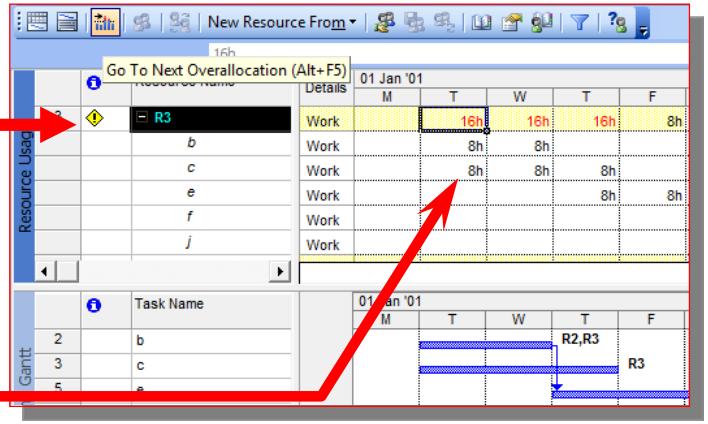


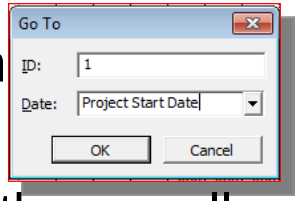
'Next Over-Allocation'



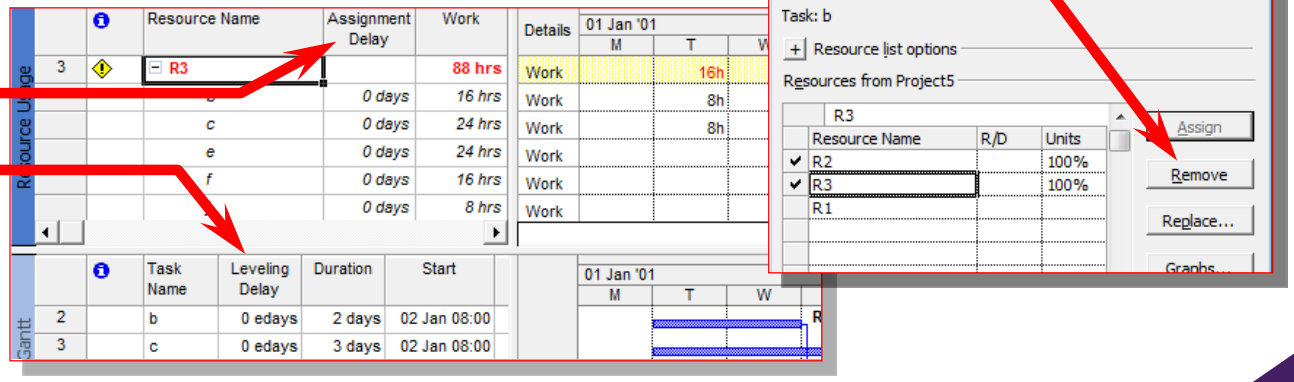
finds next task requiring levelling



– To reset to 1st over-allocation *Edit | Goto*



- Options to deal with over-allocations are:
  - Edit assignments in a *Usage view*
  - Assign new or different resources
  - Delay the assignment
  - Delay the task
  - Split the task
  - Add overtime



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Levelling By Splitting Task

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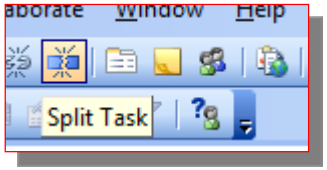
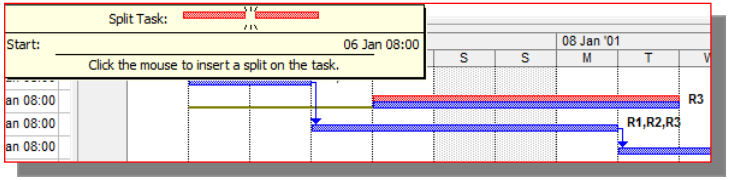
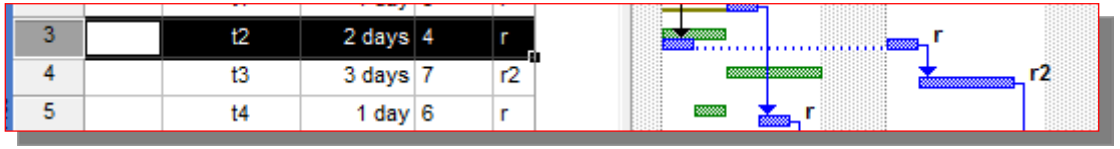
- Some tasks can be split to alleviate over allocations
  - A portion of the work is delayed



- Select the task with the split cursor at the point-in-time when work is suspended



  - Drag the split to where the task resumes
- Remove the split by dragging the split portion back-to the left
  - When tracking current status Work-in-Progress can be split
- Split shown as dotted line (by default)



Handling Over-Allocations With Overtime

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- Overtime can be allocated by inserting the column to any relevant table
  - No control over when it is shown as being worked ☹
  - When it is booked is fully track-able through a *Usage-Sheet*

	Task Name	Overtime Work	Work	Duration
1	Single Family House - Architect	0 hrs	1,814.4 hrs	158 days
2	General Conditions	0 hrs	230.4 hrs	21 days
3	Finalize plans and develop e	0 hrs	198.4 hrs	20 days
	General contractor	*0 hrs*	*80 hrs*	
	Architect	*0 hrs*	*80 hrs*	

Details	M	T	W	T	F
Work	9.92h	9.92h	9.92h	9.92h	9.92h
Ovt. Work					
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h
Work	9.92h	9.92h	9.92h	9.92h	9.92h
Ovt. Work					
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h
Work	9.92h	9.92h	9.92h	9.92h	9.92h
Ovt. Work					
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h
Work	4h	4h	4h	4h	4h
Ovt. Work					
Base. Work	4h	4h	4h	4h	4h
Work	4h	4h	4h	4h	4h
Ovt. Work					

Task Usage

	Task Name	Overtime Work	Work	Duration
1	Single Family House - Architect	30 hrs	1,814.4 hrs	158 days
2	General Conditions	30 hrs	230.4 hrs	21 days
3	Finalize plans and develop e	30 hrs	198.4 hrs	20 days
	General contractor	*30 hrs*	*80 hrs*	
	Architect	*0 hrs*	*80 hrs*	
	Owner	*0 hrs*	*19.2 hrs*	

Details	11 Jan '04											
	M	T	W	T	F	S	S	M	T	W	T	F
Work	12.32h	12.32h	12.32h	12.32h	12.32h			12.32h	12.32h	12.32h	12.32h	12.32h
Ovt. Work	2.4h	2.4h	2.4h	2.4h	2.4h			2.4h	2.4h	2.4h	2.4h	2.4h
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h			9.92h	9.92h	9.92h	9.92h	9.92h
Work	12.32h	12.32h	12.32h	12.32h	12.32h			12.32h	12.32h	12.32h	12.32h	12.32h
Ovt. Work	2.4h	2.4h	2.4h	2.4h	2.4h			2.4h	2.4h	2.4h	2.4h	2.4h
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h			9.92h	9.92h	9.92h	9.92h	9.92h
Work	12.32h	12.32h	12.32h	12.32h	12.32h			12.32h	12.32h	12.32h	12.32h	12.32h
Ovt. Work	2.4h	2.4h	2.4h	2.4h	2.4h			2.4h	2.4h	2.4h	2.4h	2.4h
Base. Work	9.92h	9.92h	9.92h	9.92h	9.92h			9.92h	9.92h	9.92h	9.92h	9.92h
Work	6.4h	6.4h	6.4h	6.4h	6.4h			6.4h	6.4h	6.4h	6.4h	6.4h
Ovt. Work	2.4h	2.4h	2.4h	2.4h	2.4h			2.4h	2.4h	2.4h	2.4h	2.4h
Base. Work	4h	4h	4h	4h	4h			4h	4h	4h	4h	4h
Work	4h	4h	4h	4h	4h			4h	4h	4h	4h	4h
Ovt. Work												
Base. Work	4h	4h	4h	4h	4h			4h	4h	4h	4h	4h
Work	0.97h	0.97h	0.97h	0.97h	0.97h			0.97h	0.97h	0.97h	0.97h	0.97h

Levelling With Delays (& Splitting e)

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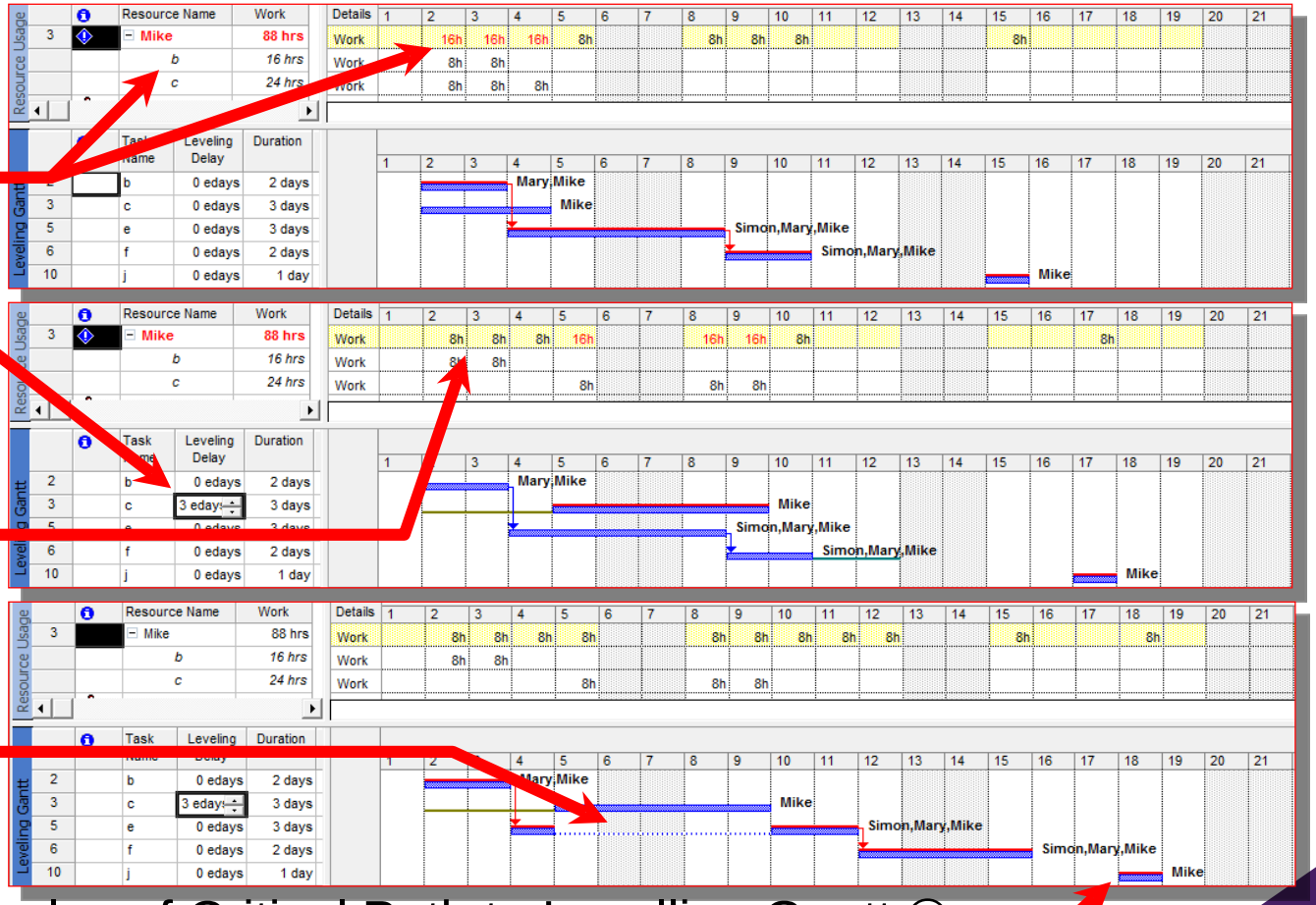
- Resource over-allocated to tasks b (critical) and c (non-critical)
- 3 edays task levelling delay added to task c
  - Days 2 & 3 now NOT over-allocated
  - Now Critical
- Task e split
  - f delayed as a result
  - Note: Useful to add display of Critical Path to Levelling Gantt ☺



Levelling Delays Are Additive

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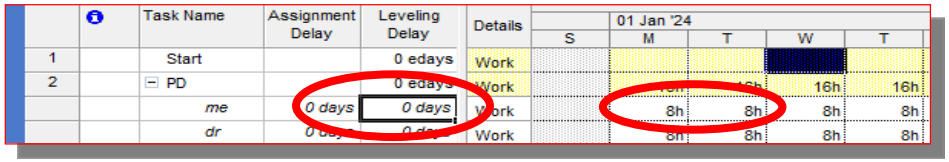
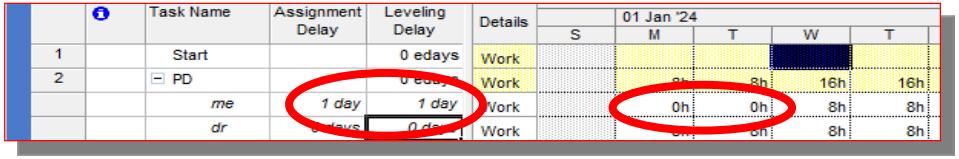
- Assignment delay will delay resource's start date
  - Levelling delay affects whole task's start date
- Delays are cumulative: Before



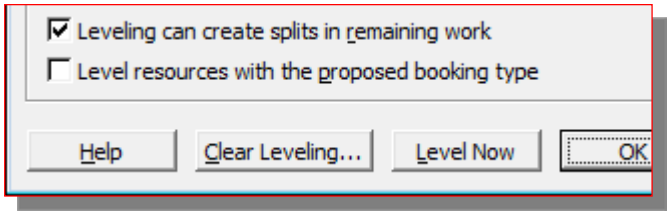
	Task Name	Assignment Delay	Leveling Delay	Details	01 Jan '24 S	M	T	W	T
1	Start		0 edays	Work					
2	PD		0 edays	Work				16h	16h
	me	*0 days*	*0 days*	Work		8h	8h	8h	8h
	dr	*0 days*	*0 days*	Work		8h	8h	8h	8h

- After Assignment and Levelling delay



	Task Name	Assignment Delay	Leveling Delay	Details	01 Jan '24 S	M	T	W	T
1	Start		0 edays	Work					
2	PD		0 edays	Work				16h	16h
	me	*1 day*	*1 day*	Work		0h	0h	8h	8h
	dr	*0 days*	*0 days*	Work		8h	8h	8h	8h

  - Levelling delay is optionally cleared before auto levelling



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Automatic Levelling

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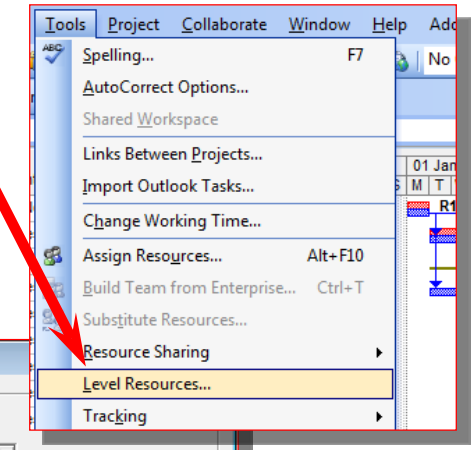
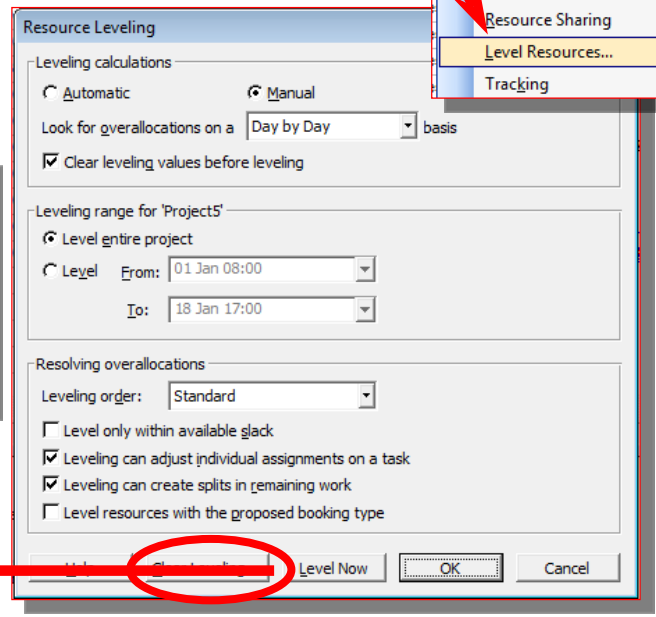
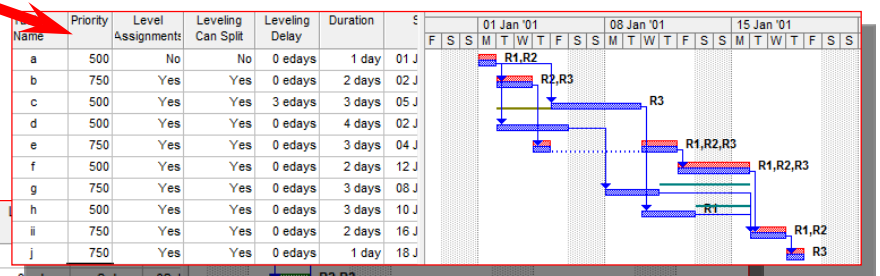
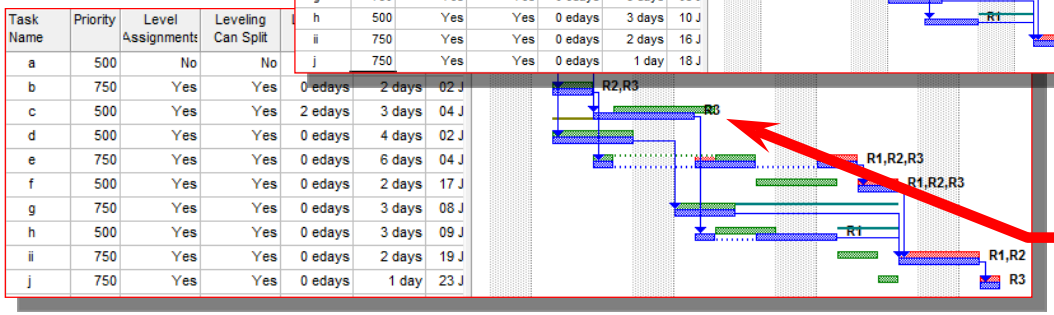
- MSPJ will Auto-level
  - Select *Tools | Level Resources… |*
- Tune by setting task priorities: Priorities range from 1-1000:
  - 1000 is highest = “Don’t delay or split”
  - Mark tasks for Split: Yes | No,
    - Level Assignments: Yes | No







Task Name	Priority	Level Assignments	Leveling Can Split	Leveling Delay	Duration
a	500	No	No	0 edays	1 day
b	750	Yes	Yes	0 edays	2 days
c	500	Yes	Yes	3 edays	3 days
d	500	Yes	Yes	0 edays	4 days
e	750	Yes	Yes	0 edays	3 days
f	500	Yes	Yes	0 edays	2 days
g	750	Yes	Yes	0 edays	3 days
h	500	Yes	Yes	0 edays	3 days
ii	750	Yes	Yes	0 edays	2 days
j	750	Yes	Yes	0 edays	1 day



Task Name	Priority	Level Assignments	Leveling Can Split	Leveling Delay	Duration
a	500	No	No	0 edays	1 day
b	750	Yes	Yes	0 edays	2 days
c	500	Yes	Yes	2 edays	3 days
d	500	Yes	Yes	0 edays	4 days
e	750	Yes	Yes	0 edays	6 days
f	500	Yes	Yes	0 edays	2 days
g	750	Yes	Yes	0 edays	3 days
h	500	Yes	Yes	0 edays	3 days
ii	750	Yes	Yes	0 edays	2 days
j	750	Yes	Yes	0 edays	1 day

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EG Case Starting Point: Wk 41

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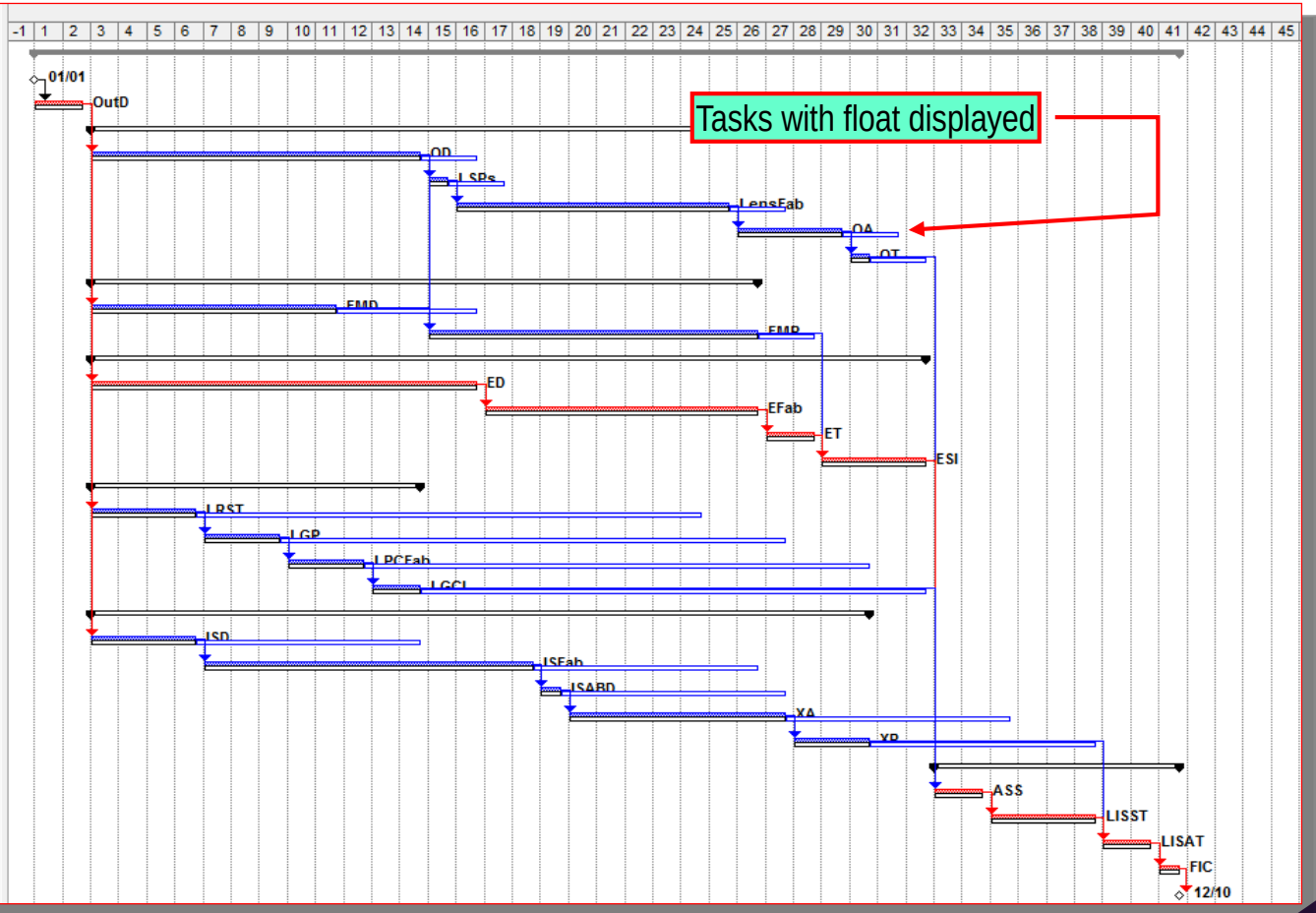
- Can be hard to determine driving factors (2007 & 2010 have useful feature)

Gantt Chart

	Task Name	Leveling Can Split	Leveling Delay
0	**Lunar Imaging System**	**Yes**	**0 edays**
1	Start-MS	Yes	0 edays
2	Outline Design	No	0 edays
3	**Optics Sub-System**	**Yes**	**0 edays**
4	Optics Design	No	0 edays
5	Lens System Parameters	No	0 edays
6	Lens Fabrication	No	0 edays
7	Optics Assembly	Yes	0 edays
8	Optics Test	No	0 edays
9	**Focusing Mechanics Ss**	**Yes**	**0 edays**
10	Focusing Mechanics Desig	No	0 edays
11	Focusing Mechanics (Purc	No	0 edays
12	**Electronics Ss**	**Yes**	**0 edays**
13	Electronics Design	No	0 edays
14	Electronics Fabrication	No	0 edays
15	Electronics Test	No	0 edays
16	ElectroServo Preparation f	No	0 edays
17	**Laser RangeFinder Ss**	**Yes**	**0 edays**
18	Laser Ranging System Ten	No	0 edays
19	Laser Generator (Purchas	No	0 edays
20	Laser Positioning Controls	No	0 edays
21	Generator & Controls Integ	No	0 edays
22	**Image Buffer XSO**	**Yes**	**0 edays**
23	Image Storage Design	No	0 edays
24	Image Store Fabrication	No	0 edays
25	Image Store As-Built Draw	No	0 edays
26	XSO Assembly	No	0 edays
27	XSO Review	No	0 edays
28	**Intg'tn & Proving Phase**	**Yes**	**0 edays**
29	Assemble Sub-Systems	No	0 edays
30	System Test	No	0 edays
31	Accept Test	No	0 edays
32	Field Installation & Calibratic	No	0 edays
33	Finish-MS	No	0 edays



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Good Automated Solutions are Possible

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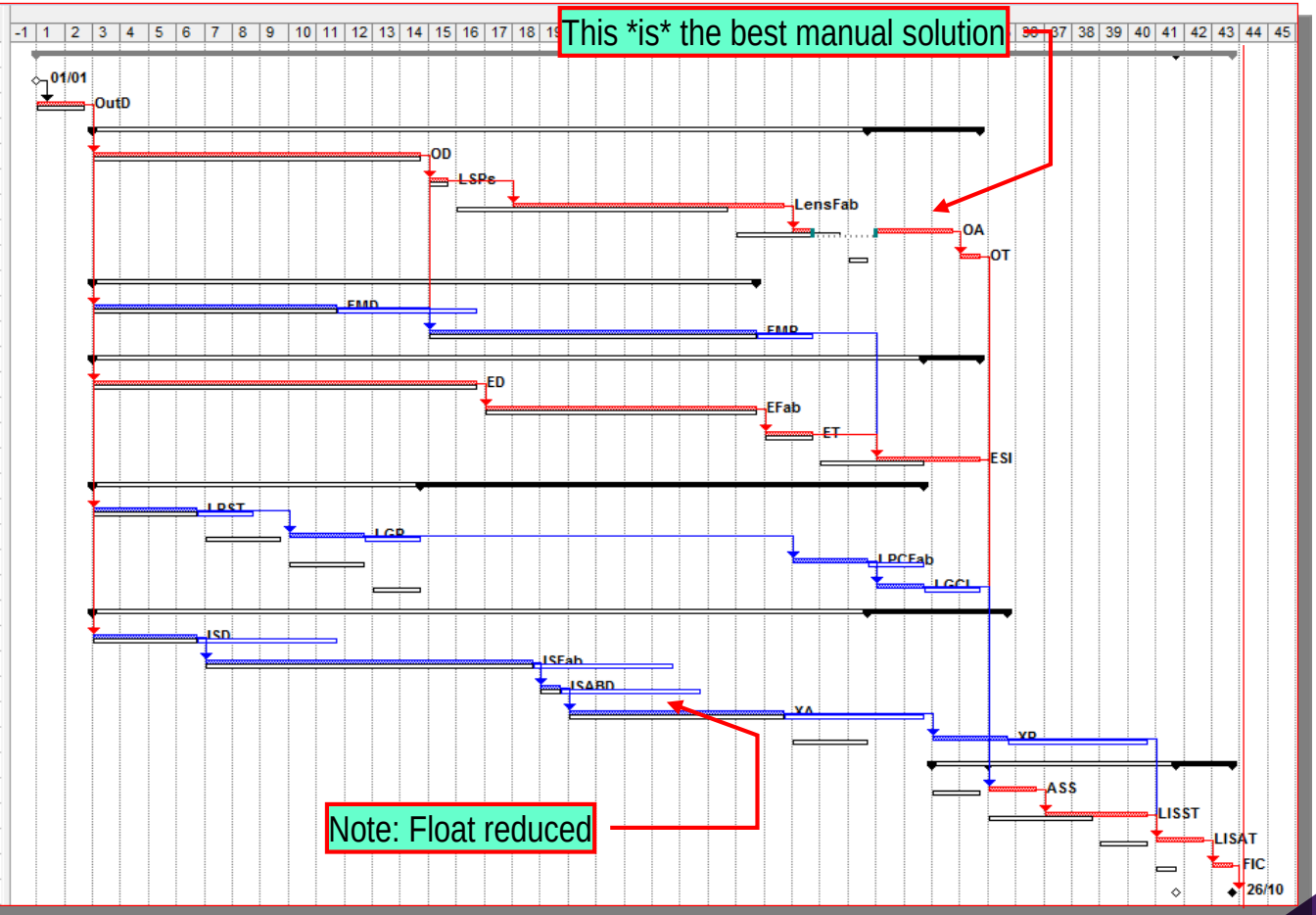
- In this case by setting Levelling Can Split to No on all but Optics Assembly

	Task Name	Leveling Can Split	Leveling Delay
0	**Lunar Imaging System**	**Yes**	**0 edays**
1	Start-MS	Yes	0 edays
2	Outline Design	No	0 edays
3	**Optics Sub-System**	**Yes**	**0 edays**
4	Optics Design	No	0 edays
5	Lens System Parameters	No	0 edays
6	Lens Fabrication	No	14 edays
7	Optics Assembly	Yes	0 edays
8	Optics Test	No	0 edays
9	**Focusing Mechanics Ss**	**Yes**	**0 edays**
10	Focusing Mechanics Desig	No	0 edays
11	Focusing Mechanics (Purc	No	0 edays
12	**Electronics Ss**	**Yes**	**0 edays**
13	Electronics Design	No	0 edays
14	Electronics Fabrication	No	0 edays
15	Electronics Test	No	0 edays
16	ElectroServo Preparation fi	No	14 edays
17	**Laser RangeFinder Ss**	**Yes**	**0 edays**
18	Laser Ranging System Ten	No	0 edays
19	Laser Generator (Purchas	No	21 edays
20	Laser Positioning Controls	No	105 edays
21	Generator & Controls Integ	No	0 edays
22	**Image Buffer XSO**	**Yes**	**0 edays**
23	Image Storage Design	No	0 edays
24	Image Store Fabrication	No	0 edays
25	Image Store As-Built Draw	No	0 edays
26	XSO Assembly	No	0 edays
27	XSO Review	No	35 edays
28	**Intg'tn & Proving Phase**	**Yes**	**0 edays**
29	Assemble Sub-Systems	No	0 edays
30	System Test	No	0 edays
31	Accept Test	No	0 edays
32	Field Installation & Calibratic	No	0 edays
33	Finish-MS	No	0 edays



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Contents: Cash-Flow and Cumulative Costs

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- Critical path and levelling

- Cash-flows and cumulative costs
  - Save the baseline

- Adding risk To The baseline

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Draw the Cumulative Resource Curve

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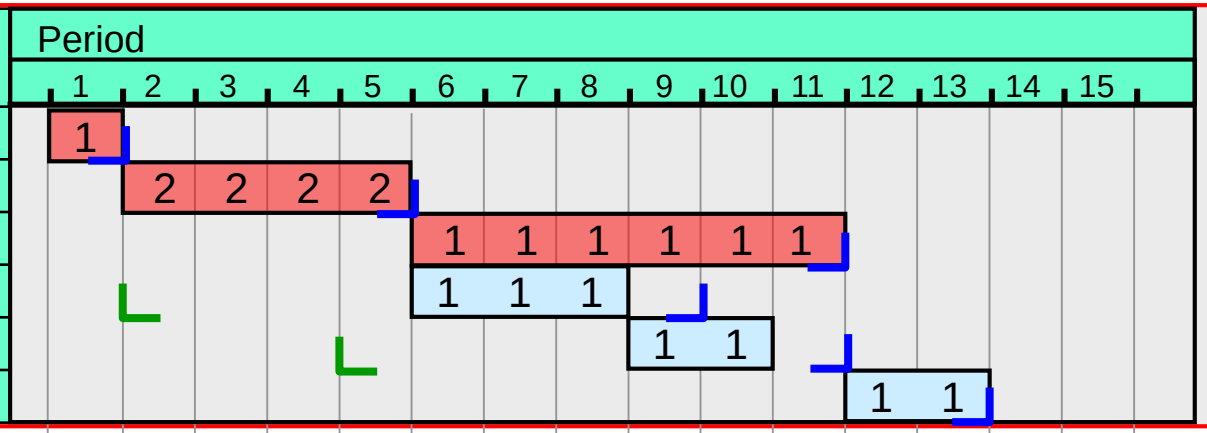
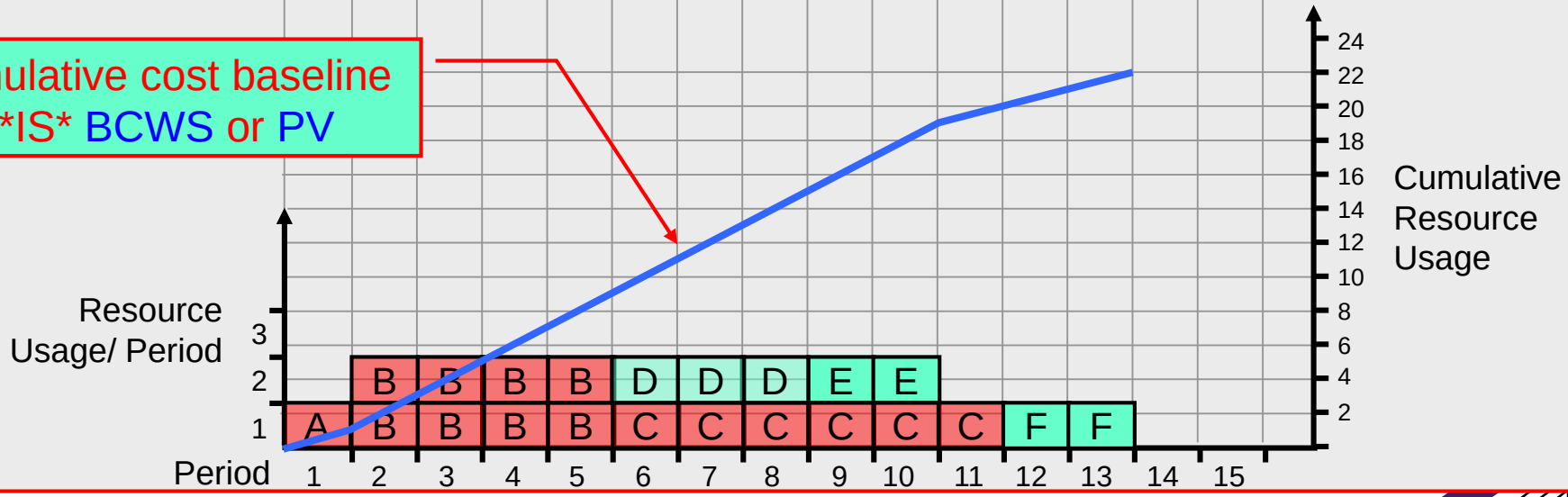
Task	Duration
A	1
B	4
C	6
D	3
E	2
F	2



The cumulative cost baseline
This *IS* BCWS or PV



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Displaying Cost Graphs

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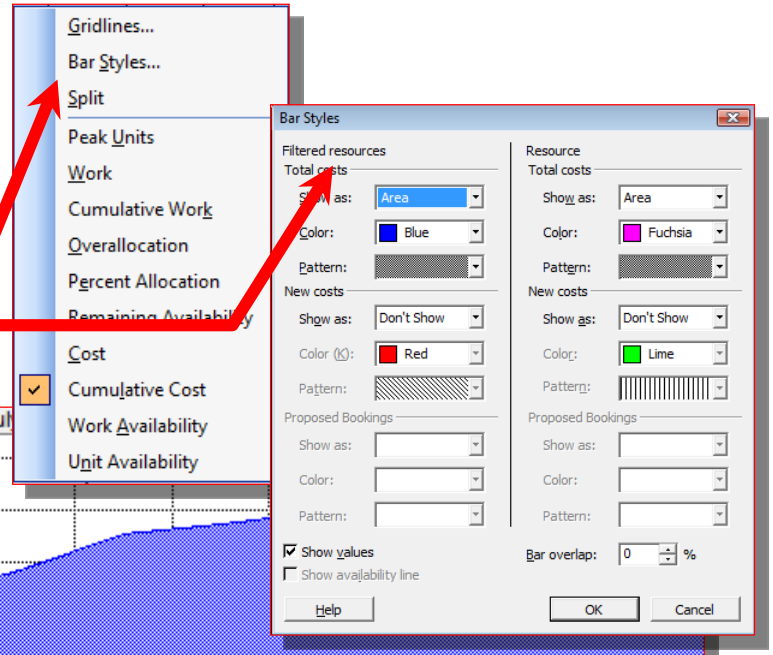
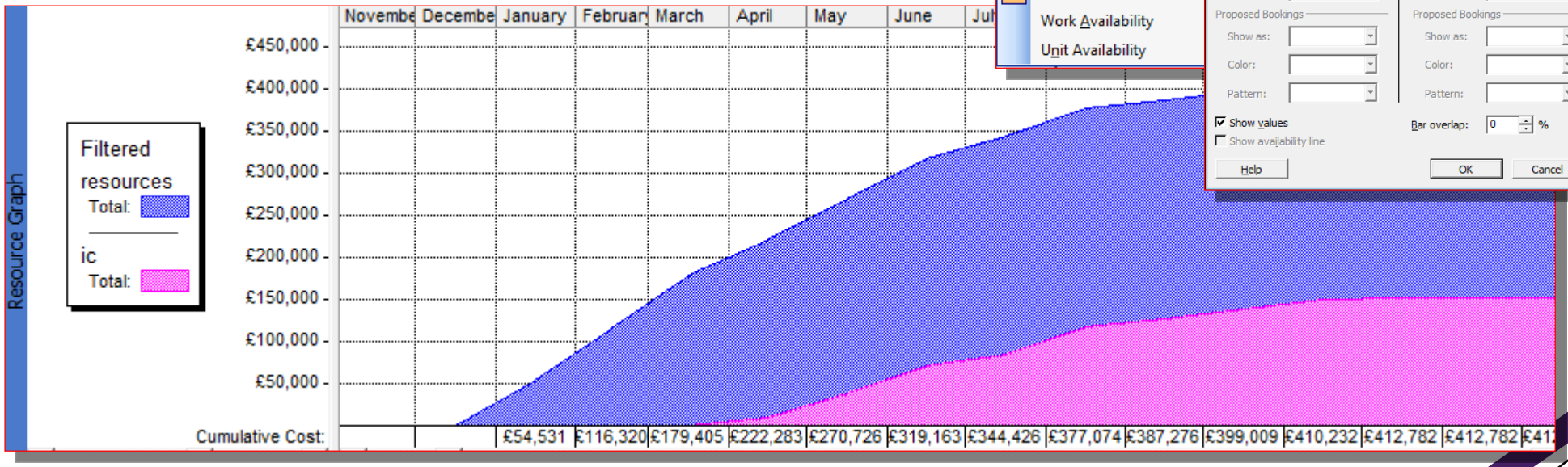
- *View | Resource Graph* – Simple!
- Step to display cumulative cost is same as cumulative over-allocations
  - *Right-Click* the background
  - Select "*Bar styles*" & "*Show as*" for '*filtered*'





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Save A Baseline

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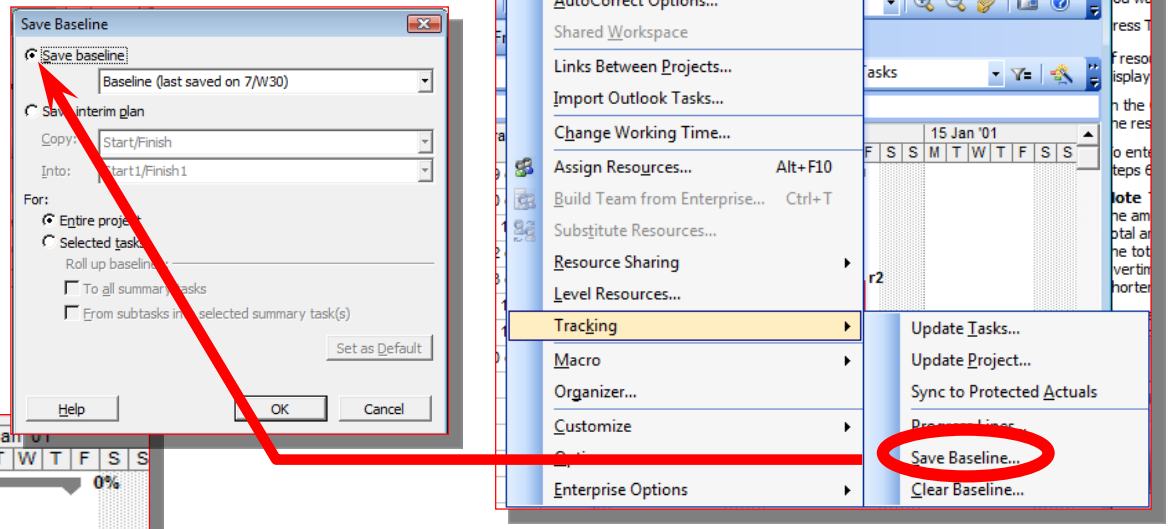
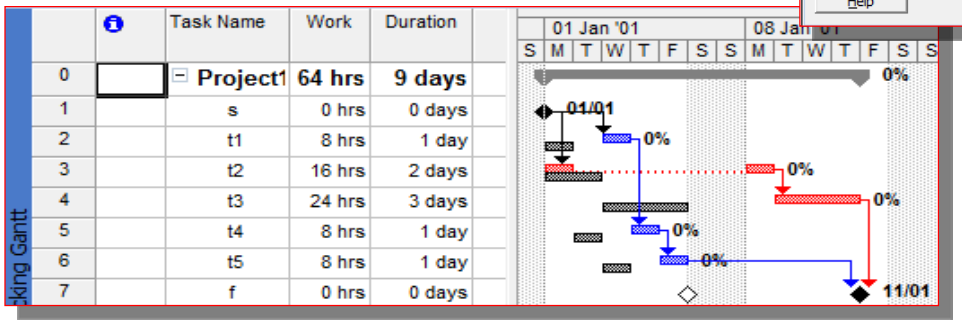
- A baseline stores current values for later comparison
  - Enables Earned Value





- Baseline displayed in ½ height grey bar by default
  - Only displayed in some views
    - Easy to turn on via Gantt wizard or *Right-Click | Bar Styles*

Baseline's Contents

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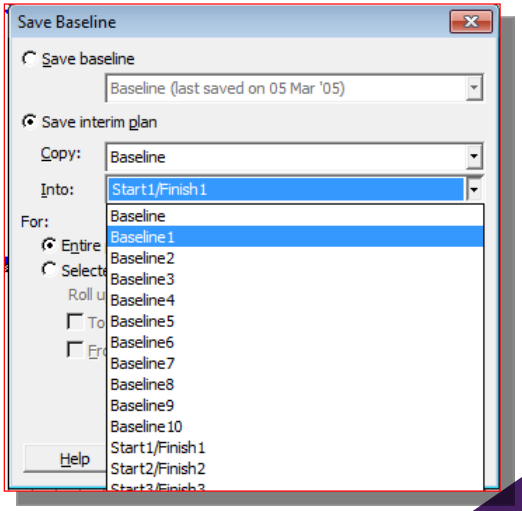
- A Baseline saves each task's
  - Cost, Duration, Finish, Start, Work
  - Initial save "Entire project", Subsequent saves "Selected tasks"
  - "Selected tasks" save only modifies Summary Tasks if option selected
    - Can be cleared *Tools | Tracking | Clear Baseline… | Specific baseline*
  - Interim plans save only task start and finish dates

- MSPJ provides 'The Baseline' plus 10 numbered baselines and 10 numbered Start/ Finish
  - An old baseline can be preserved
  - A baseline can be copied (before being amended or overwritten)
  - EV works against any baseline selected



Displaying Baselines

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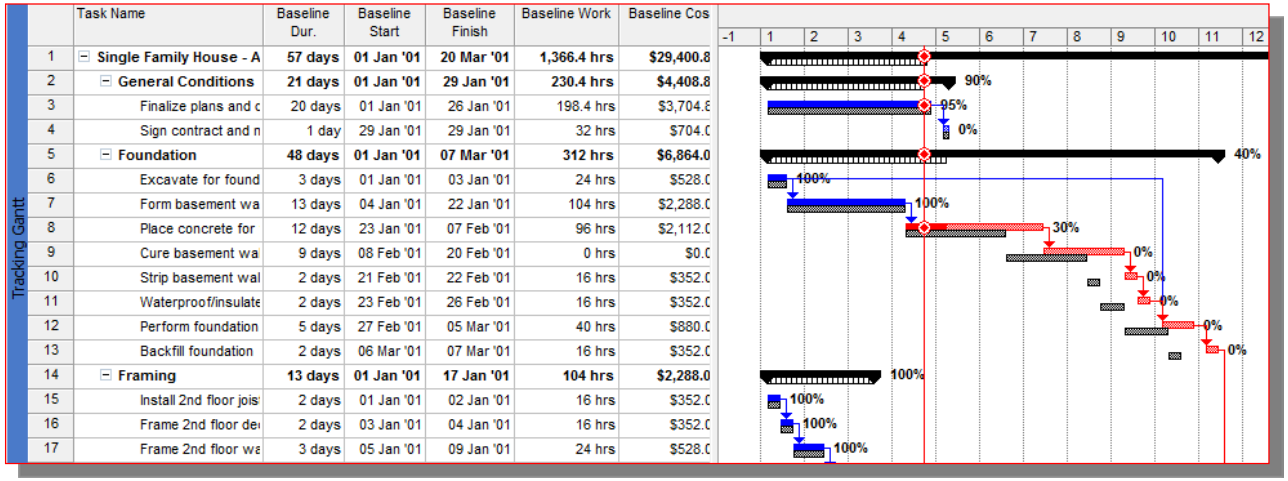
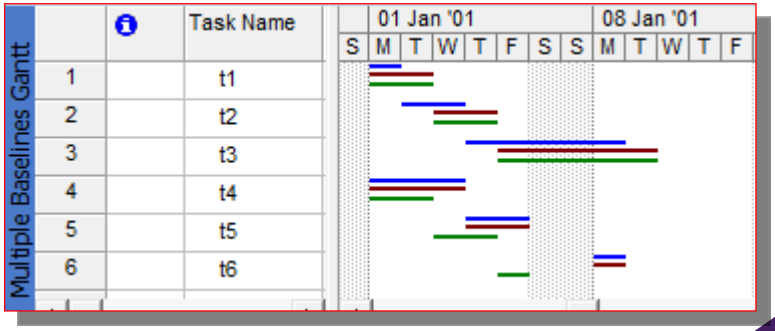
- Display with *Tracking Gantt* and *Baseline Table*
  - Baseline table allows edit of baseline data
    - Baselines probably shouldn't be edited!



- Multiple Baselines View shows baseline, baseline-1 and -2
  - You have to create your own view to show -3 through -10



Contents: Adding Risk To The Baseline

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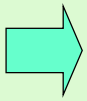
- Critical path and levelling
- Cash-flows and cumulative costs
  - Save the baseline



Adding risk To The baseline

Accommodating Risk In The Base-Line

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- Baselines require inclusion of responses to threat and opportunity
  - Responses in the baseline must address risk event and risk outcome
  - Responses to the event are in Plan-“A”
    - Tasks identified and selected to be taken belong in the WBS
    - All tasks in the committed WBS are scheduled
  - Contingencies are in Plan-“B”
    - Tasks identified, not yet selected
    - Selection is contingent on some triggering event becoming certain
    - Even contingent actions must be within cost and schedule baseline to be available to the project manager and sponsor

- Unselected, unbudgeted, unallocated, uncommitted responses are only in the risk register

Handling Risk

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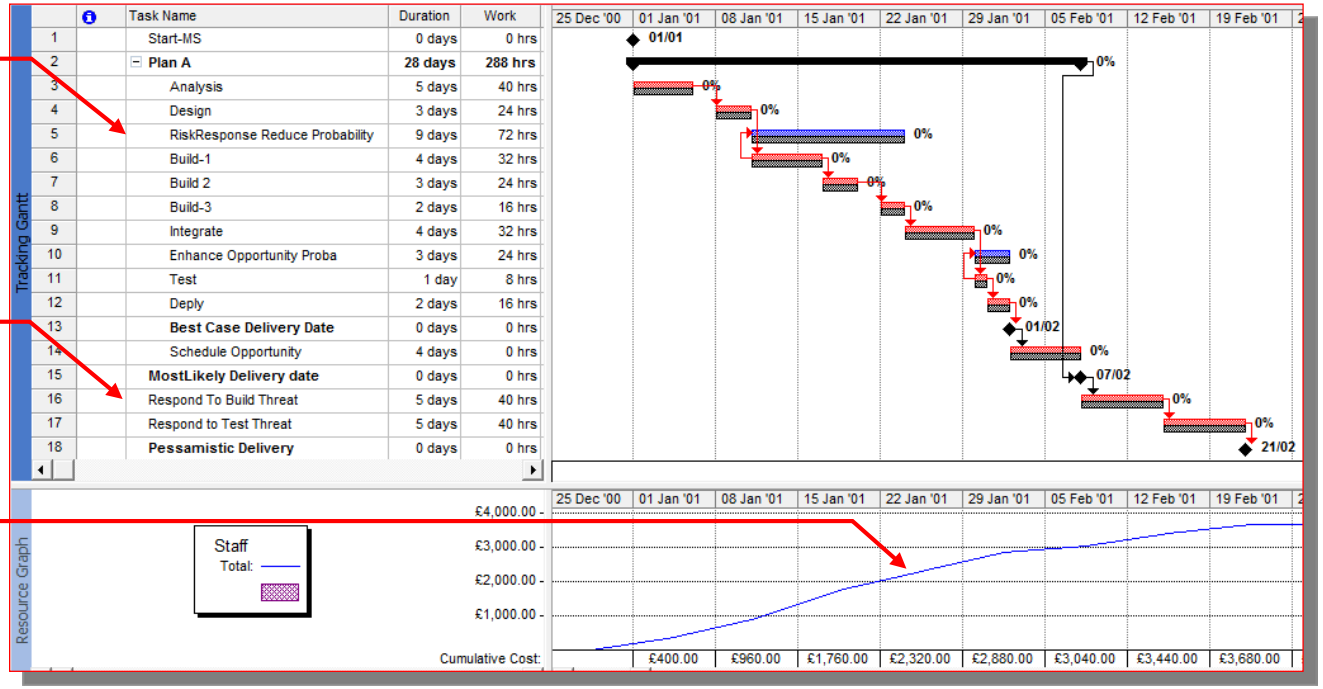
- Plan-"A" baseline includes actions (from WBS) to address probability of events
  - Plan-"B" actions to react to events
    - In the baseline after best and before worst deliver date and max budget

Proactive actions to make threat less likely to happen (or impact less significant)

Contingent actions to make threat impact less painful

Total costs include provisions for threat & opportunity responses



Tracking Risk Status

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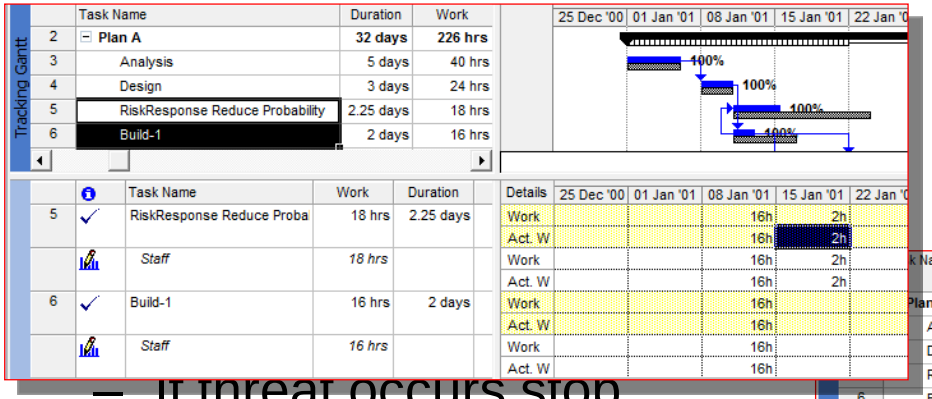
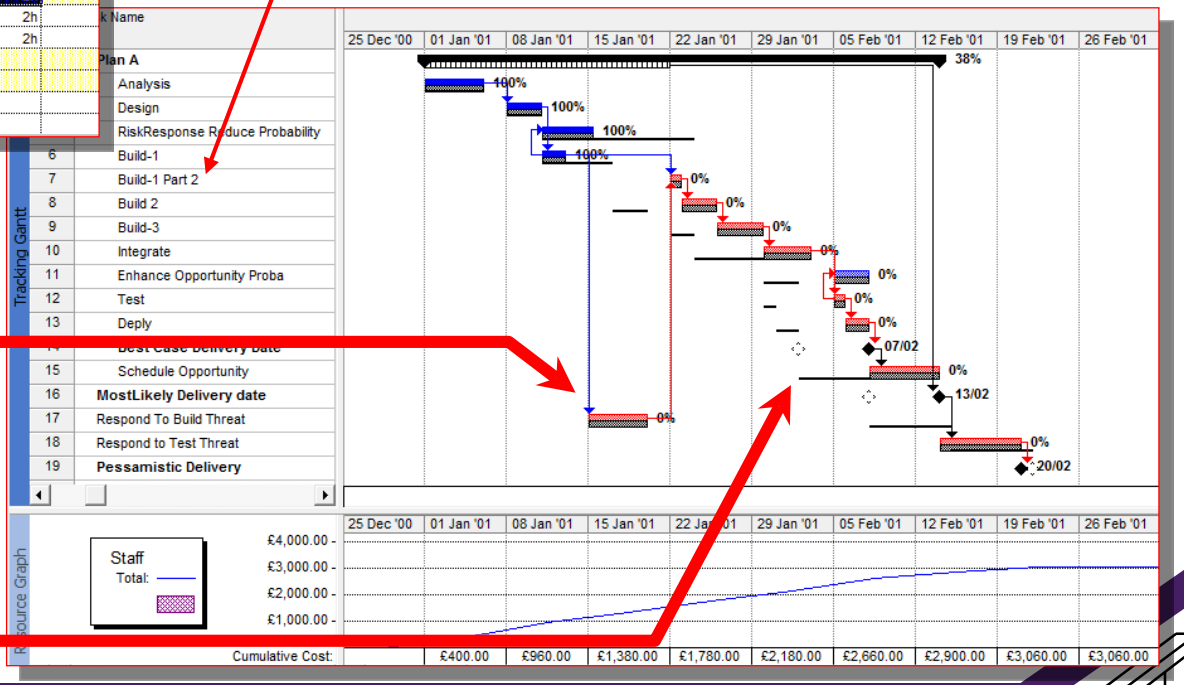
- Project tracked as normal until threat is removed or irrelevant or event occurs
  - If threat occurs stop preventative measures
  - Start recovery action: Now!
  - Perhaps snap-shot an additional baseline?
  - Original baseline now baseline-1



Work interrupted
Contingent response now actioned
(IE reschedule threat response)



Project After Risk Responses

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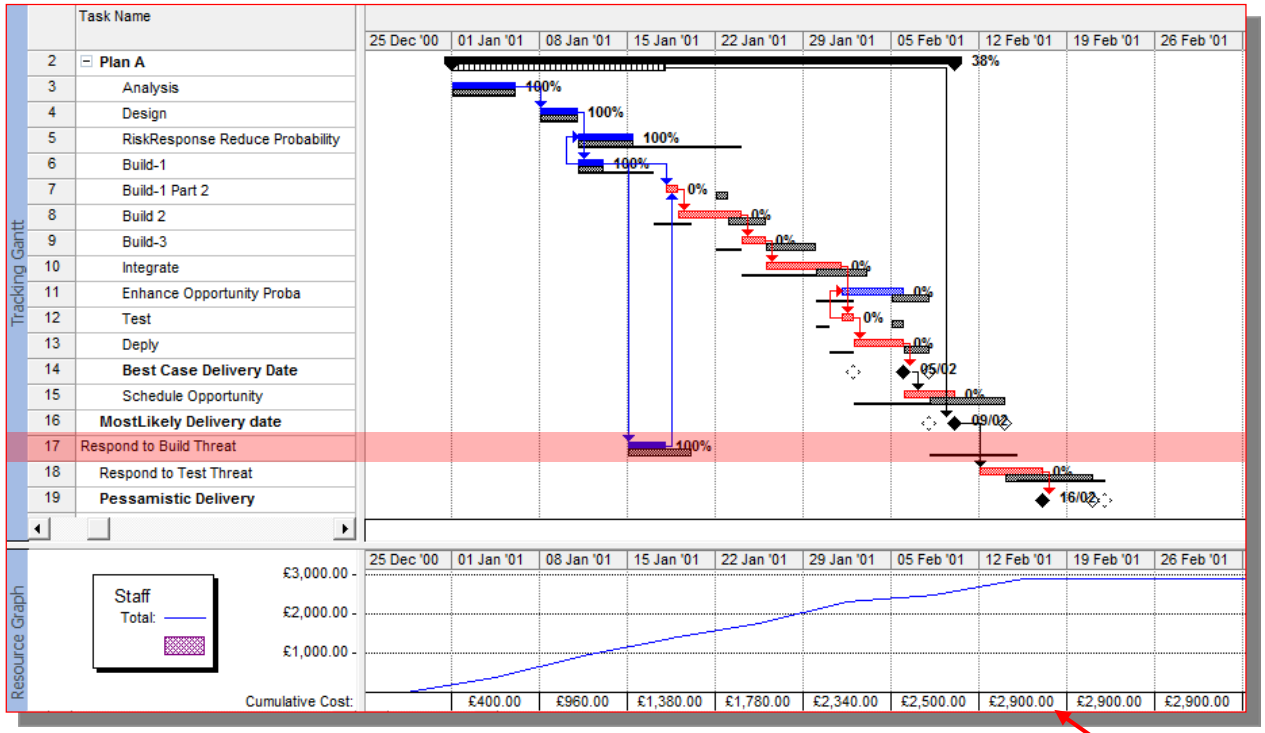
- When recovery actions are complete resume normal project actions
  - If recovery quicker and cheaper than expected (EG not needed) project EAC drops
- Risk response can be in a single buffer
  - Should reflect ∑EMV of all threats & opportunities (!)
  - Could be negative!!
- Response task can be relocated (see next slide)
  - Will be re-linked if auto-linking is set on



Budget At Completion Reduced (in this case)

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EAC = Estimate at Completion

Reschedule Contingent Task

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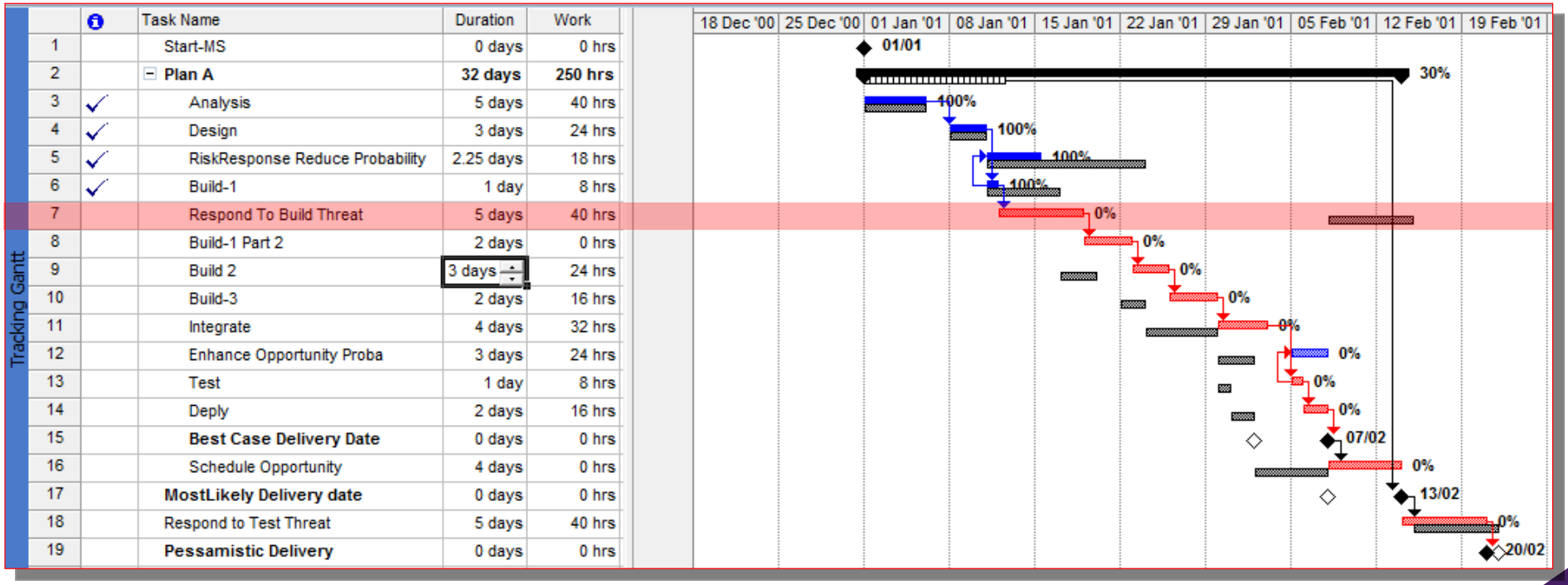
- Alternatively drag contingent task between tasks interrupted and following on in the Gantt
  - Where automatic linking is enabled



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MSPJ's Inclusion of Risk

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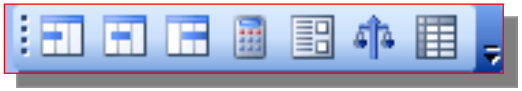
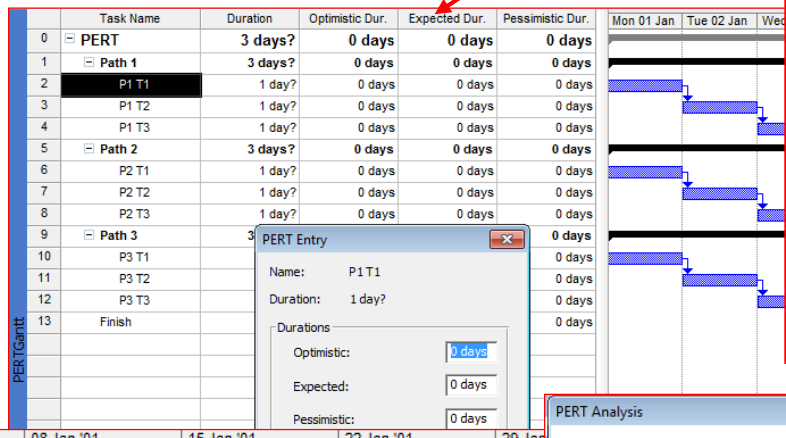
- MSPJ has rudimentary PERT analysis
  - Accessed via PERT toolbar

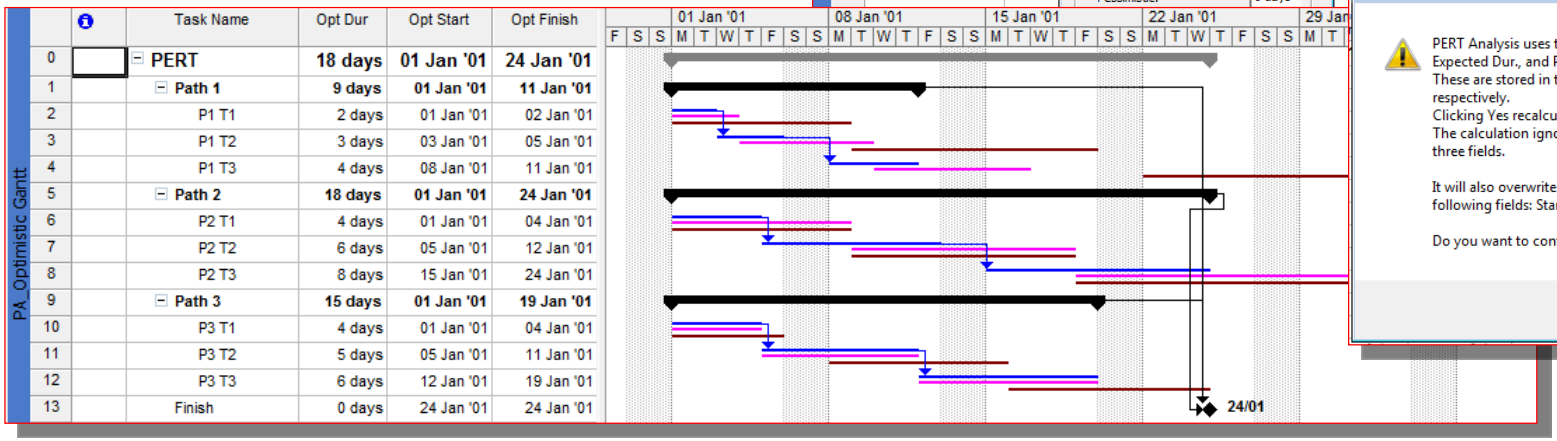


  - *Not worth using*

- Use Excel (details later) or a "proper" Monte Carlo Add-in

MSPJ adds 3 columns (Optimistic, Expected, Pessimistic) and uses a macro that PARTIALLY understands 3Pt. Results stored in Start/ Finish 1, 2 & 3
Views to show results also unsatisfactory although can be extended





Monte-Carlo Add-Ins

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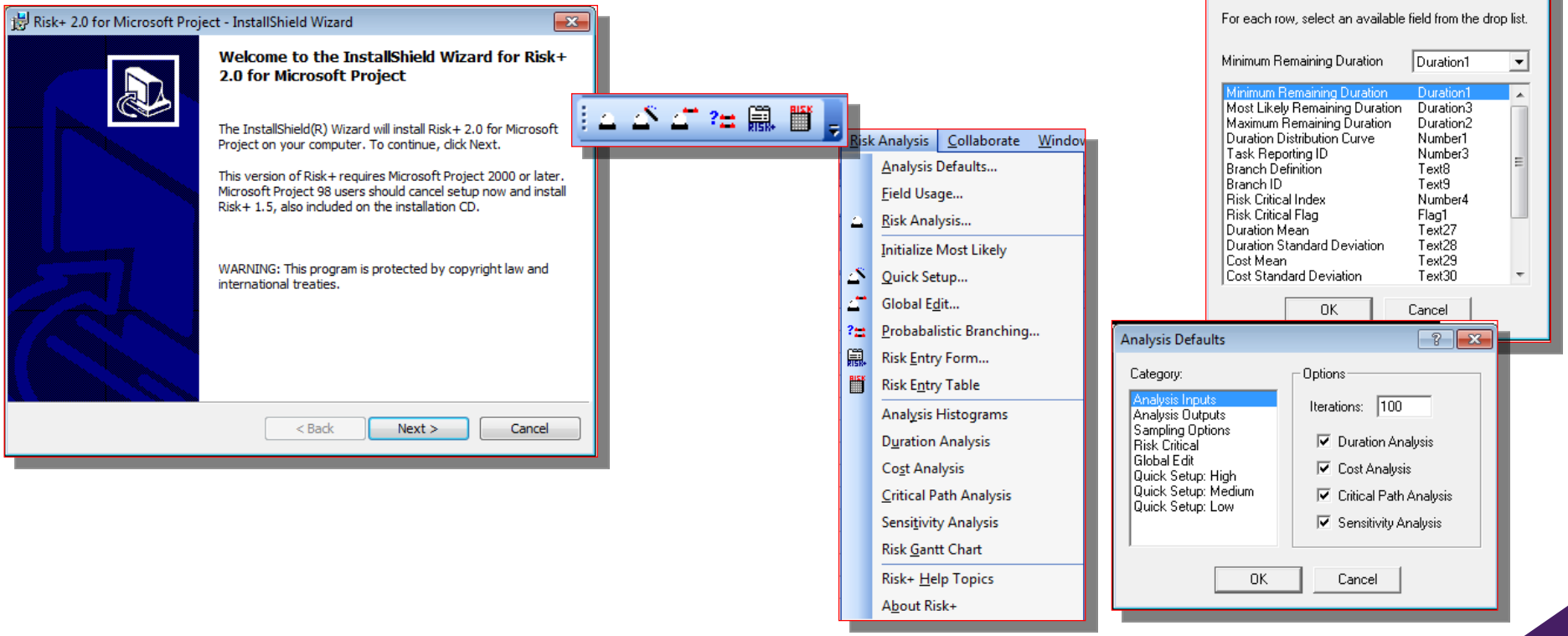
- Several third parties sell comprehensive Monte-Carlo tools
  - Installed as .DLL libraries, macros and new menus/ buttons/ views



Set-up The Simulation

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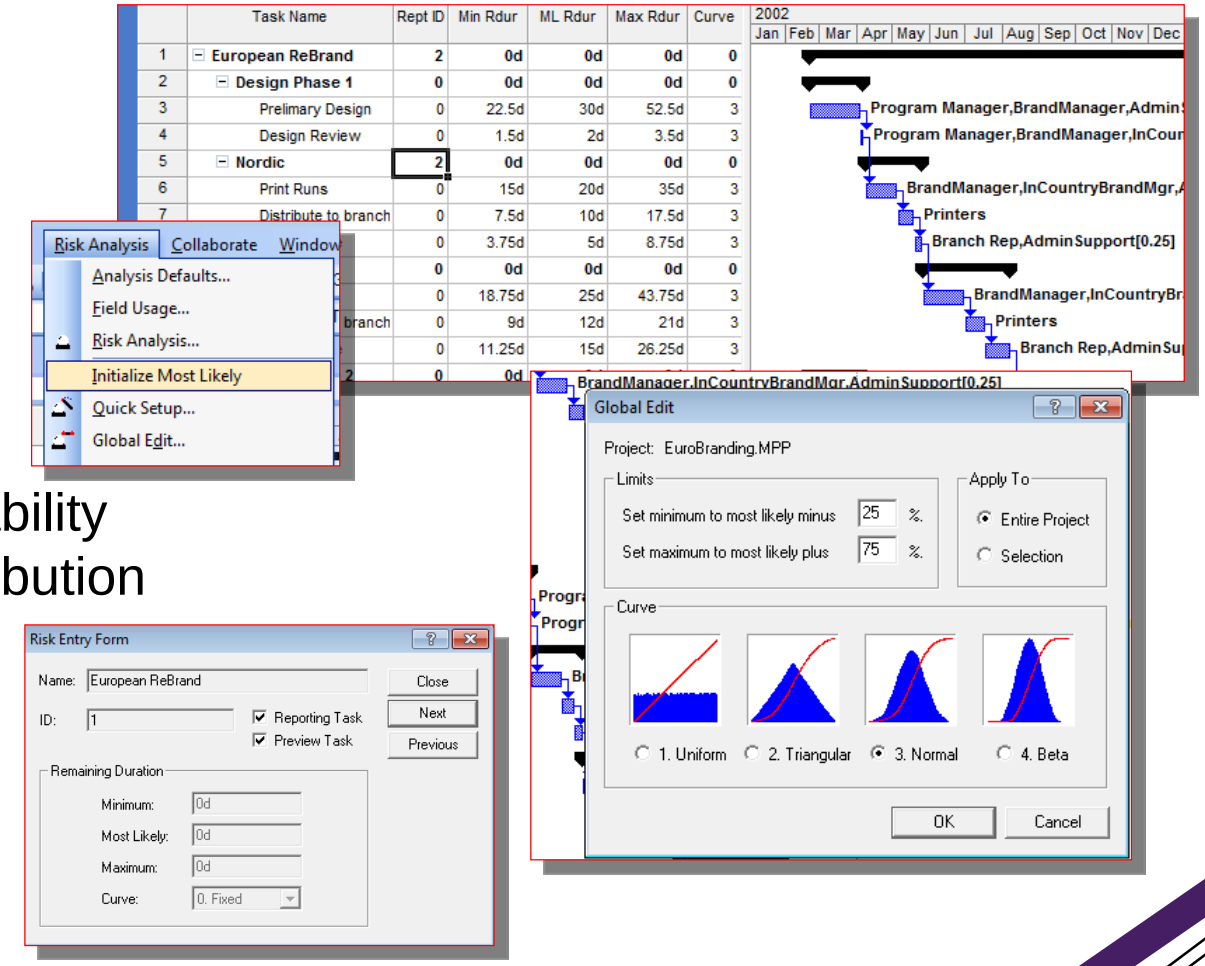
- General use first sets up the project as usual

- Assign each task optimistic, pessimistic and expected durations
  - Assign each task a probability density function aka distribution
  - Select tasks to report for (Could be all)



Random Selection of a 3PE Value

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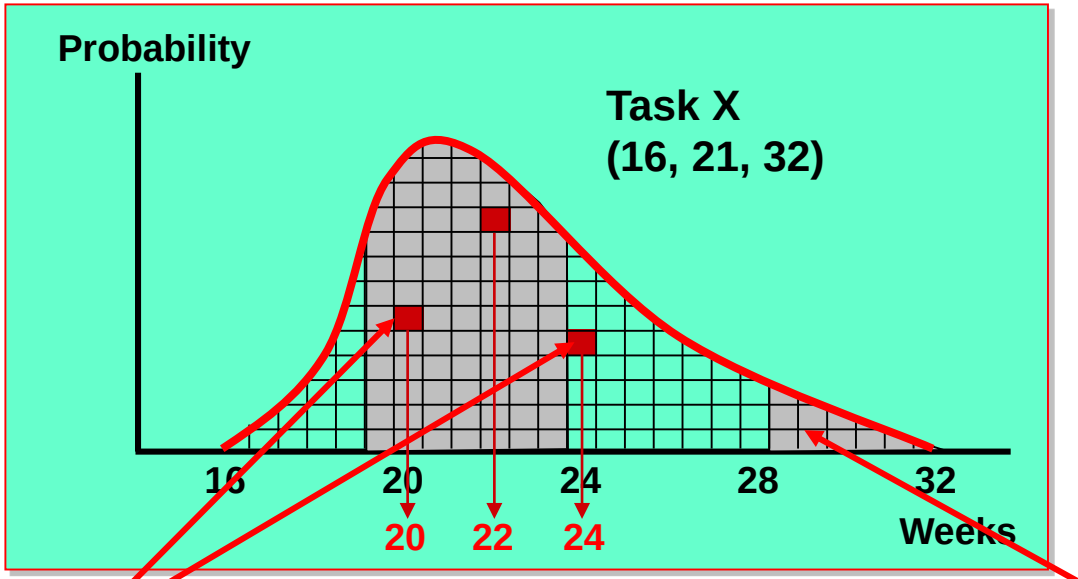
- Pick value for each activity, weighted to activity's distribution
  - Take probability of each value into account in value selection



- Split area under curve into 100 equal segments
- Randomly pick value from 1-100
  - Ensures outcome is weighted to activity distribution
- Randomly pick box and translate value into weeks

Almost half of random values fall into 19-23 weeks. 5% in Wk 28-32

Run Simulation

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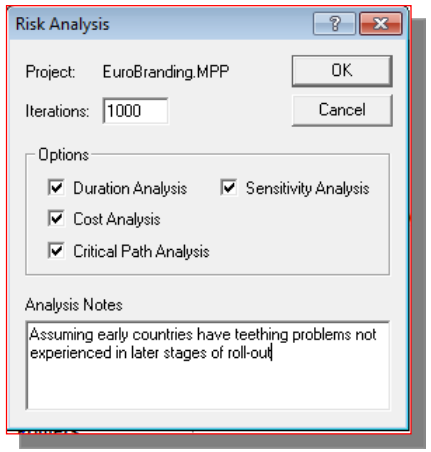
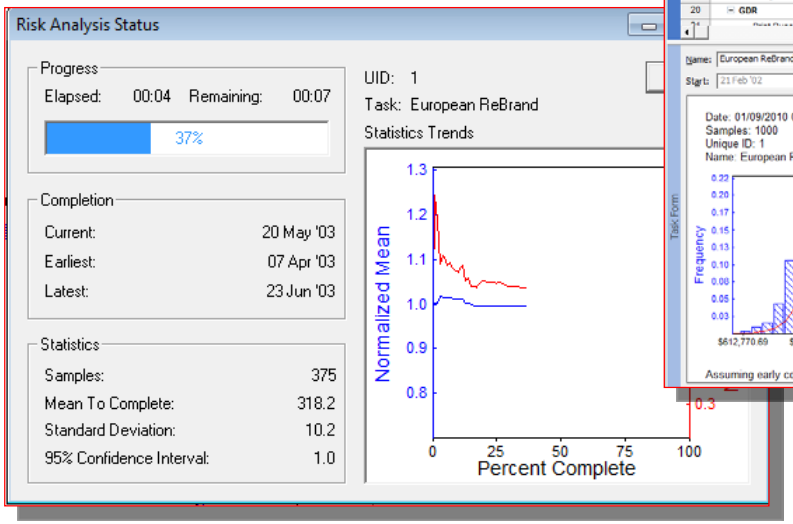
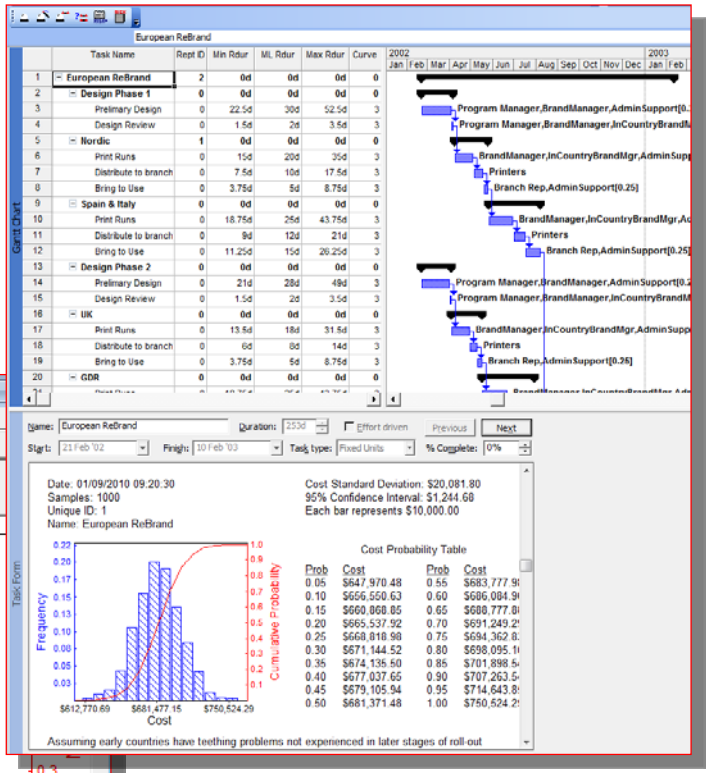
- Each task is assigned a random duration within its distribution
  - Critical path analysis performed
  - Dates recorded
  - Process repeats
- Final result includes two distribution curves
  - Project duration and cost







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Analyse Results

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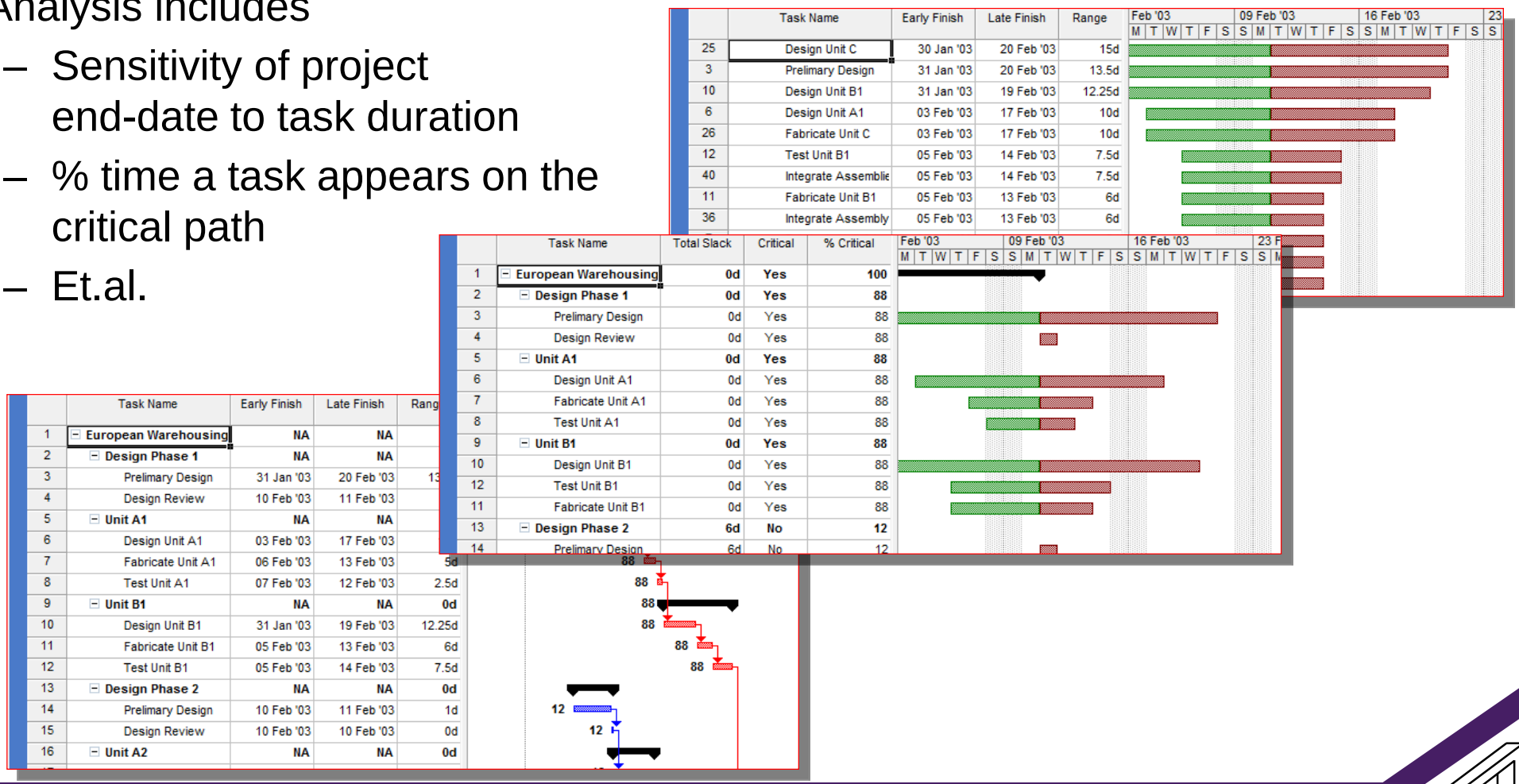
- Analysis includes
  - Sensitivity of project end-date to task duration
  - % time a task appears on the critical path
  - Et.al.



	Task Name	Early Finish	Late Finish	Range
25	Design Unit C	30 Jan '03	20 Feb '03	15d
3	Prelimary Design	31 Jan '03	20 Feb '03	13.5d
10	Design Unit B1	31 Jan '03	19 Feb '03	12.25d
6	Design Unit A1	03 Feb '03	17 Feb '03	10d
26	Fabricate Unit C	03 Feb '03	17 Feb '03	10d
12	Test Unit B1	05 Feb '03	14 Feb '03	7.5d
40	Integrate Assemblie	05 Feb '03	14 Feb '03	7.5d
11	Fabricate Unit B1	05 Feb '03	13 Feb '03	6d
36	Integrate Assembly	05 Feb '03	13 Feb '03	6d

	Task Name	Total Slack	Critical	% Critical
1	European Warehousing	0d	Yes	100
2	Design Phase 1	0d	Yes	88
3	Prelimary Design	0d	Yes	88
4	Design Review	0d	Yes	88
5	Unit A1	0d	Yes	88
6	Design Unit A1	0d	Yes	88
7	Fabricate Unit A1	0d	Yes	88
8	Test Unit A1	0d	Yes	88
9	Unit B1	0d	Yes	88
10	Design Unit B1	0d	Yes	88
12	Test Unit B1	0d	Yes	88
11	Fabricate Unit B1	0d	Yes	88
13	Design Phase 2	6d	No	12
14	Prelimary Design	6d	No	12

	Task Name	Early Finish	Late Finish	Rang
1	European Warehousing	NA	NA	
2	Design Phase 1	NA	NA	
3	Prelimary Design	31 Jan '03	20 Feb '03	13
4	Design Review	10 Feb '03	11 Feb '03	
5	Unit A1	NA	NA	
6	Design Unit A1	03 Feb '03	17 Feb '03	
7	Fabricate Unit A1	06 Feb '03	13 Feb '03	5d
8	Test Unit A1	07 Feb '03	12 Feb '03	2.5d
9	Unit B1	NA	NA	0d
10	Design Unit B1	31 Jan '03	19 Feb '03	12.25d
11	Fabricate Unit B1	05 Feb '03	13 Feb '03	6d
12	Test Unit B1	05 Feb '03	14 Feb '03	7.5d
13	Design Phase 2	NA	NA	0d
14	Prelimary Design	10 Feb '03	11 Feb '03	1d
15	Design Review	10 Feb '03	10 Feb '03	0d
16	Unit A2	NA	NA	0d

Adding Uncertainties

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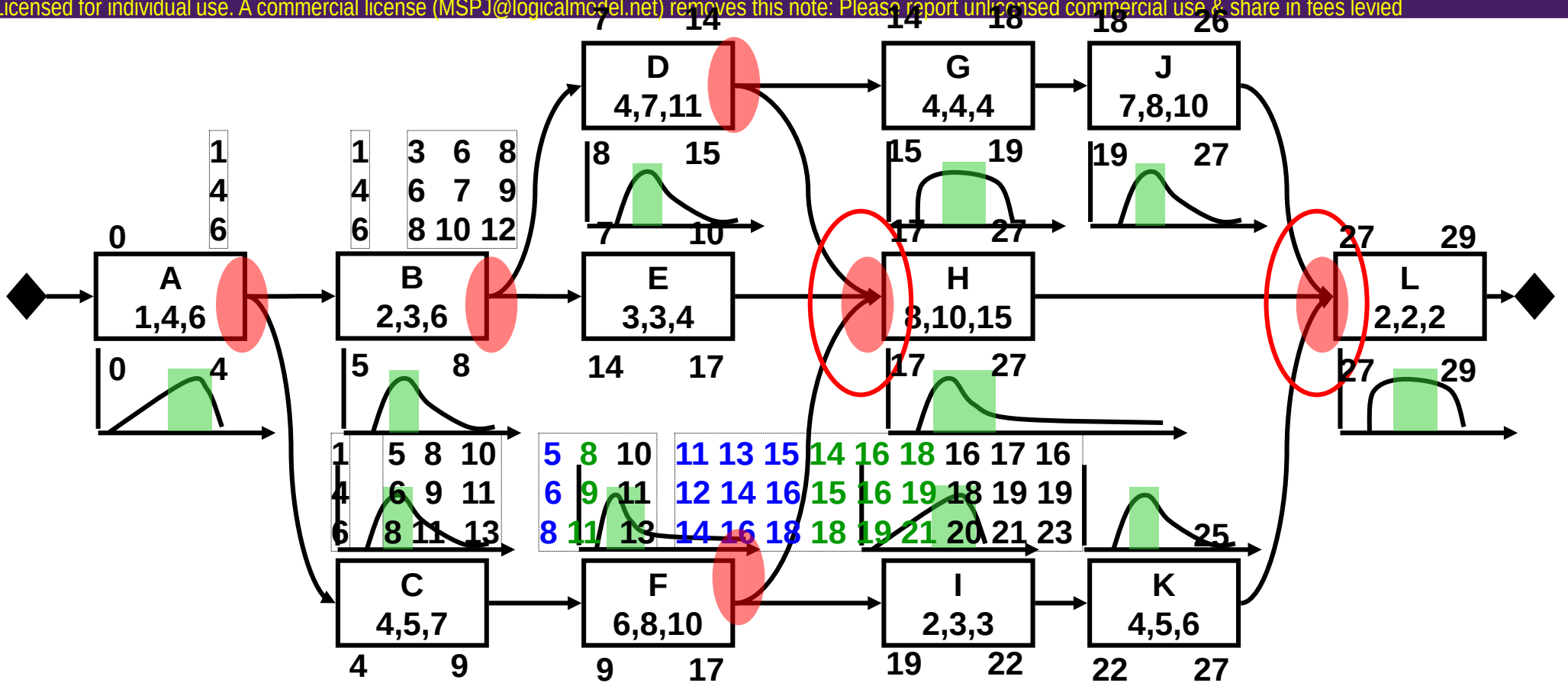

- Project expected = ∑ (e1 + e2 + e3 + e4…….
- Project sd = √∑(sd1**2 + sd2**2 + sd3**2 + sd4**2 + …)

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Using A Spread Sheet To Assess Contingency

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- Critical path tasks benefit from schedule protection
- All tasks benefit from budget protection
- Steps
  - Schedule in MSPJ
  - Calculate in XL
  - Add schedule buffer(s) to MSPJ

Task	Best	ML	Worst	e	SD	CP	Float	SD*SD	Schedule Protection
A	1.00	4.00	6.00	3.83	0.83	1.00		0.69	0.69
B	2.00	3.00	6.00	3.33	0.67		1.00	0.44	
C	4.00	5.00	7.00	5.17	0.50	1.00		0.25	0.25
D	4.00	7.00	11.00	7.17	1.17		1.00	1.36	
E	3.00	3.00	4.00	3.17	0.17		7.00	0.03	
F	6.00	8.00	10.00	8.00	0.67	1.00		0.44	0.44
G	4.00	4.00	4.00	4.00			1.00		
H	8.00	10.00	15.00	10.5	1.17	1.00		1.36	1.36
I	2.00	3.00	3.00	2.83	0.17		2.00	0.03	
J	7.00	8.00	10.00	8.17	0.50		1.00	0.25	
K	4.00	5.00	6.00	5.00	0.33		2.00	0.11	
L	2.00	2.00	2.00	2.00	0.00	1.00		0.00	0.00
Length of CP & Total Effort				E=63.17 CP=29.5		Effort & CP protection		2.23	1.66

- Can easily be semi-automated: We will see how later

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Showing Schedule Contingency

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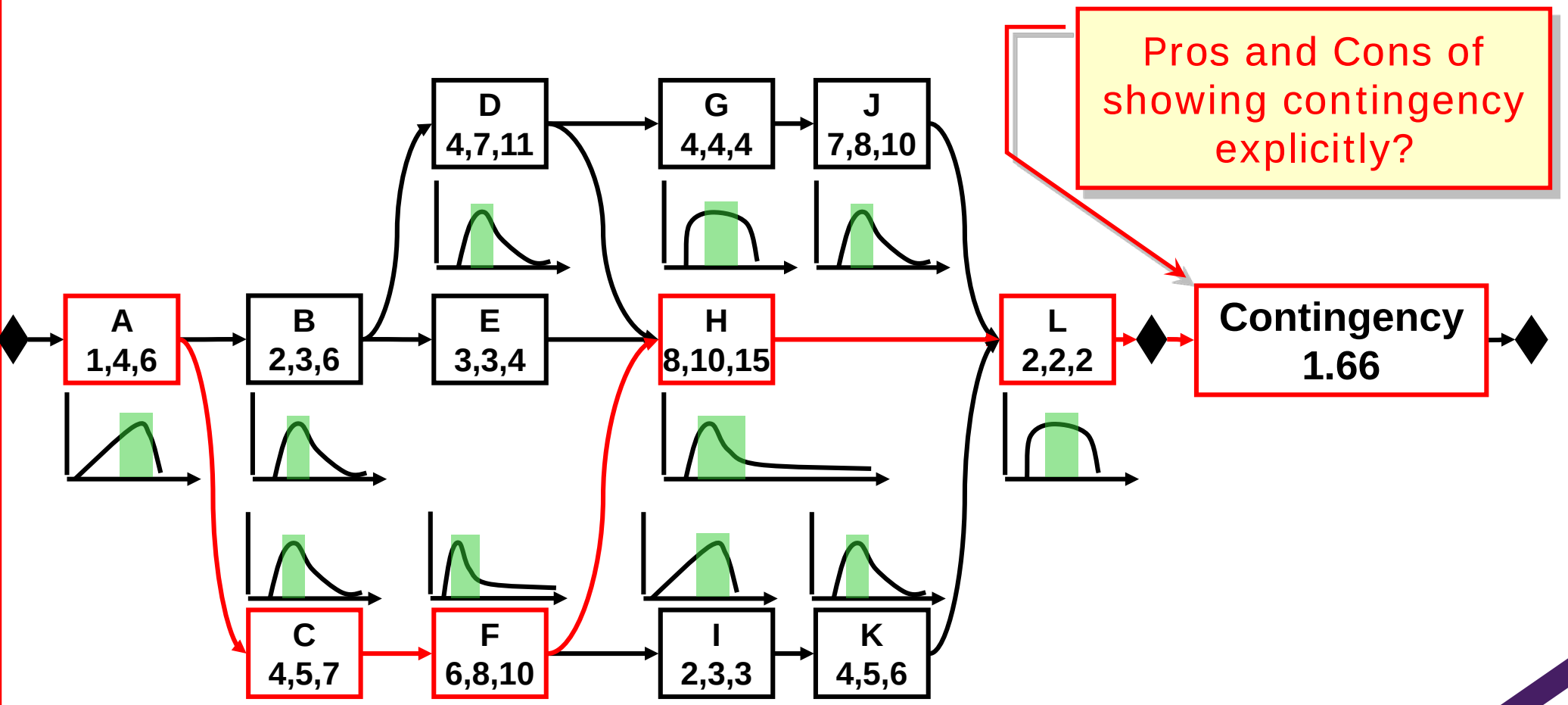

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Summary

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- Balancing work and resources requires
  - Tuning resource assignments (and task dependencies)
  - Requires visibility of Critical Path for decision making
- Initial assessment of time-phased assignments often needs levelling
  - Desire for efficient resource usage often drives need to smooth
  - Usage views are best for detailed smoothing and levelling
- Work in scope must include responses to threat and opportunity
  - Use an Add-In tool or a spreadsheet to calculate allowances
- Results of Risk assessment and resource balancing determines schedule and cash-flow
  - When ready for execution save a baseline

Case-Study: Levelling Resource Assignments 1/2

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- Assigning resources established a best case schedule
  - What we hope for isn't possible
    - We must level resource assignments to allow for:
    - People's holidays,
    - Sub-contractors availability dates and
    - Management's resource allocations
  - Starting where the last part left off
    - You can use Case 3.3 CorrectAssignments if you wish
    - (Open as Copy?)

Case-Study: Levelling Resource Assignments 2/2

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- Update the resources for their availability
  - Only 2 Optical Engineers (Eng-O) available in weeks 7-9
  - No Sub Contractor till week 18 (then only 1)
  - Limit of 3 Tech-I's and none in weeks 29 & 30
    - Recall *View | Resource Sheet, Resource Information | General | Resource Availability*
    - To translate week numbers to dates
      Display Timeline in weeks and float cursor over required weeks
    - May help to split the screen with *Resource Sheet* above and *Resource Graph* below

- You may want to save results when resource constraints have been applied
  - In order to try manual and automated leveling on your project file

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Case-Study: Eng-O Resource Limits

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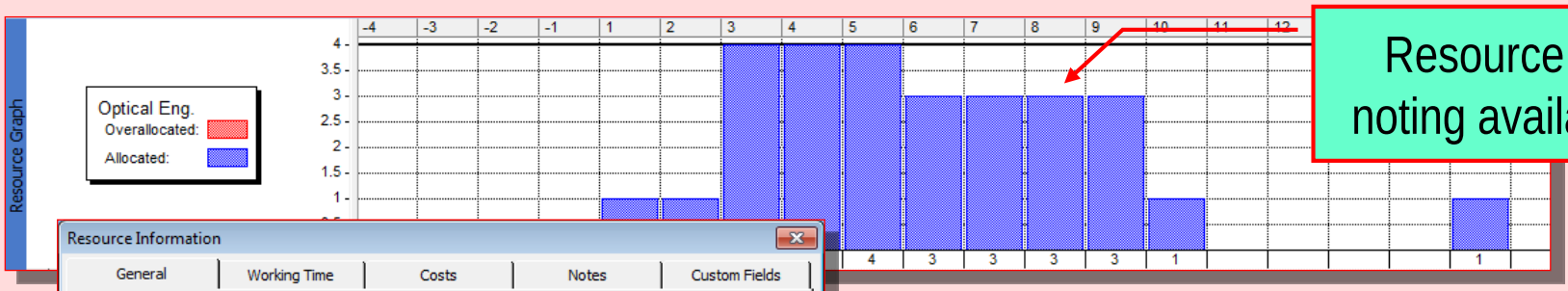
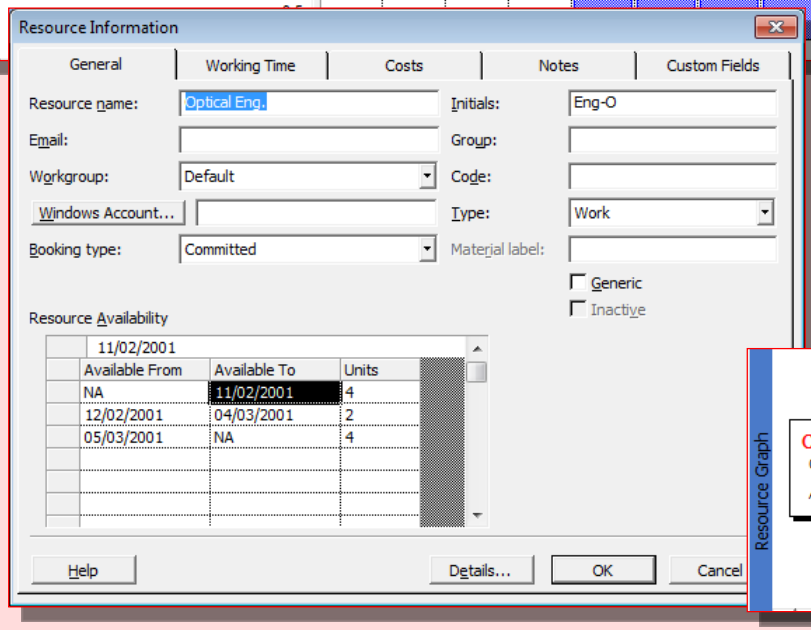
- Resolving allocations requires rescheduling tasks
  - The project has only two Optical Engineers (Eng-O) in wk 7-9

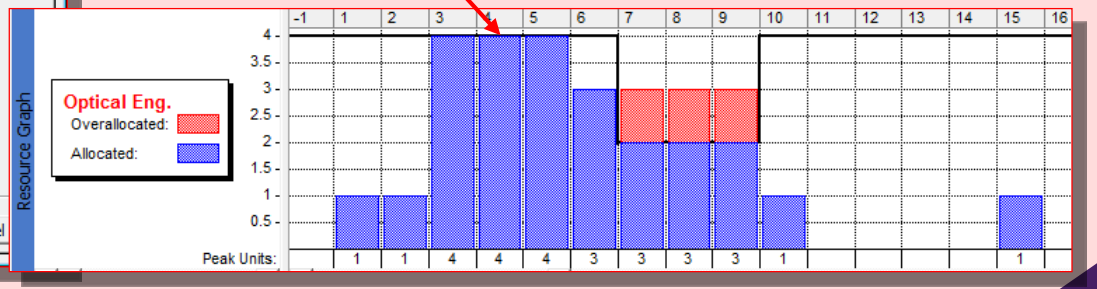


Resource profile before noting availability Case-3.3



Resource profile after noting availability

Partial answer : Case-4.1 Ready to level



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Case-Study: S-C and Tech-I Resource Limits

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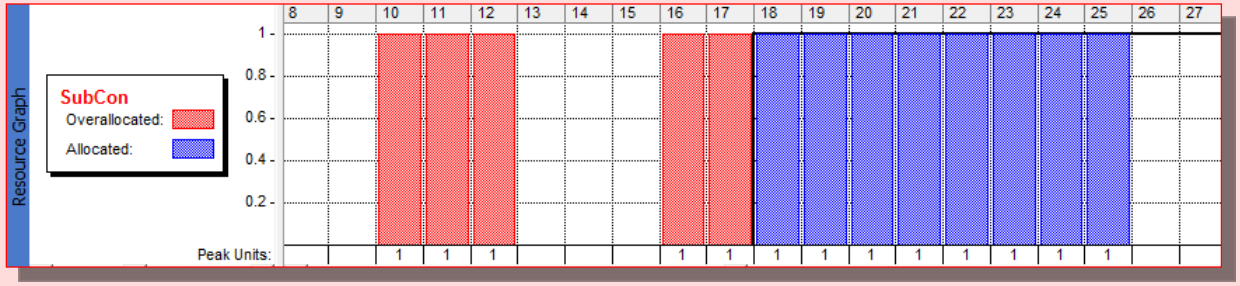
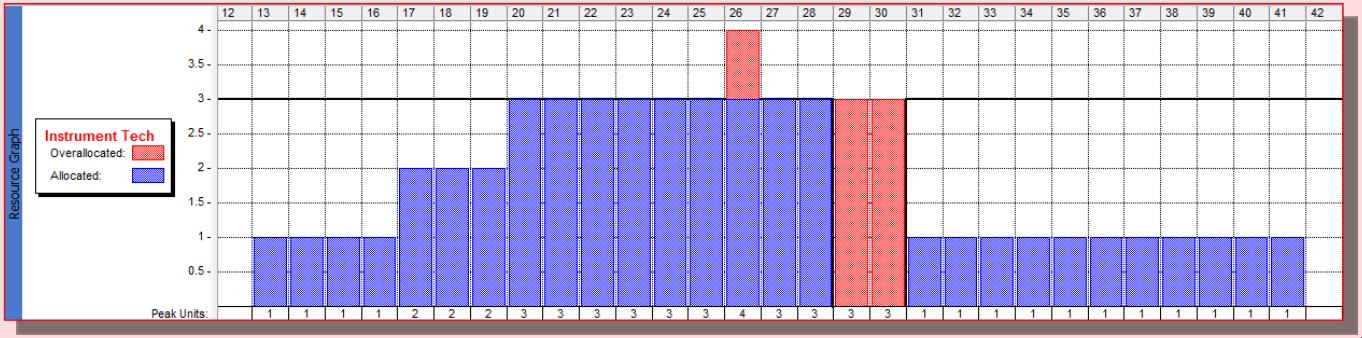
- Resolving allocations requires rescheduling tasks
  - No Sub Contractor till week 18
  - Only 3 Instrument Technicians (Tech-I) in total





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Case-Study: Resolving Over-Allocations 1/2

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- Use Resource Management toolbar and Resource Usage sheet to resolve over-allocations

Resource Usage

		Resource Name	Work	Details	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Unassigned	0 hrs	Work																				
1		Optical Eng.	1,120 hrs	Work	40h	40h	160h	160h	160h	120h	120h	120h	120h	40h					40h					
		Outline Design	*80 hrs*	Work	40h	40h																		
		Optics Design	*320 hrs*	Work			40h	40h	40h	40h	40h	40h	40h	40h										
		Lens System Pa	*40 hrs*	Work															40h					
		Focusing Mecha	*280 hrs*	Work			40h	40h	40h	40h	40h	40h	40h											
		Laser Ranging S	*160 hrs*	Work			40h	40h	40h	40h														
		Laser Generato	*120 hrs*	Work							40h	40h	40h											
		Image Storage L	*120 hrs*	Work			40h	40h	40h															
2		Drawing Office	640 hrs	Work	0h	40h	0h	0h	40h	40h	0h	0h	80h	80h	80h	40h	40h	80h	40h	40h			40h	
3		SubCon	520 hrs	Work										40h	40h	40h				40h	40h	40h	40h	40h
4		Instrument Tech	2,200 hrs	Work													40h	40h	40h	40h	80h	80h	80h	120h
5		Electrical Eng.	480 hrs	Work			40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h						
6		Fabr'tn Dept	480 hrs	Work							40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h		

Resource Name	Work	Details	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
SubCon	520 hrs	Work	40h	40h	40h				40h	40h	40h	40h	40h	40h	40h	40h	40h	40h																
Instrument Tech	2,200 hrs	Work				40h	40h	40h	40h	80h	80h	80h	120h	120h	120h	120h	120h	120h	160h	120h	120h	120h	120h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h

- Save when done and try again using automated levelling

Case-Study: Resolving Over-Allocations 2/2

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- After over allocations are resolved some task dates are ‘right-shifted’

Resource Usage

	Resource Name	Work	Details	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Unassigned	0 hrs	Work																				
1	Optical Eng.	1,120 hrs	Work	40h	40h	160h	160h	160h	120h	80h	80h	80h	80h	40h	40h			40h					
	Outline Design	*80 hrs*	Work	40h	40h																		
	Optics Design	*320 hrs*	Work			40h	40h	40h	40h	40h	40h	40h	40h										
	Lens System Pa	*40 hrs*	Work															40h					
	Focusing Mech	*280 hrs*	Work			40h	40h	40h	40h	40h	40h	40h											
	Laser Ranging S	*160 hrs*	Work			40h	40h	40h	40h														
	Laser Generato	*120 hrs*	Work										40h	40h	40h								
	Image Storage L	*120 hrs*	Work			40h	40h	40h															
2	Drawing Office	640 hrs	Work	0h	40h	0h	0h	40h	40h	0h	0h	80h	80h	80h	40h	40h	80h	40h	40h			40h	
3	SubCon	520 hrs	Work																		40h	40h	40h
4	Instrument Tech	2,200 hrs	Work															40h	40h	80h	80h	80h	120h
5	Electrical Eng.	480 hrs	Work			40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h						
6	Fabr'tn Dept	480 hrs	Work							40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h		

Resource Name	Work	Details	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
SubCon	520 hrs	Work									40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h													
Instrument Tech	2,200 hrs	Work						40h	40h	80h	80h	80h	120h	120h	120h	120h	120h	120h	120h	80h	80h	0h	0h	120h	120h	120h	120h	80h	40h	40h	40h	40h	40h	40h	40h	40h

– After levelling Case-4.2 AutoLevelled

Case-Study: Levelled, Ready to Base-Line

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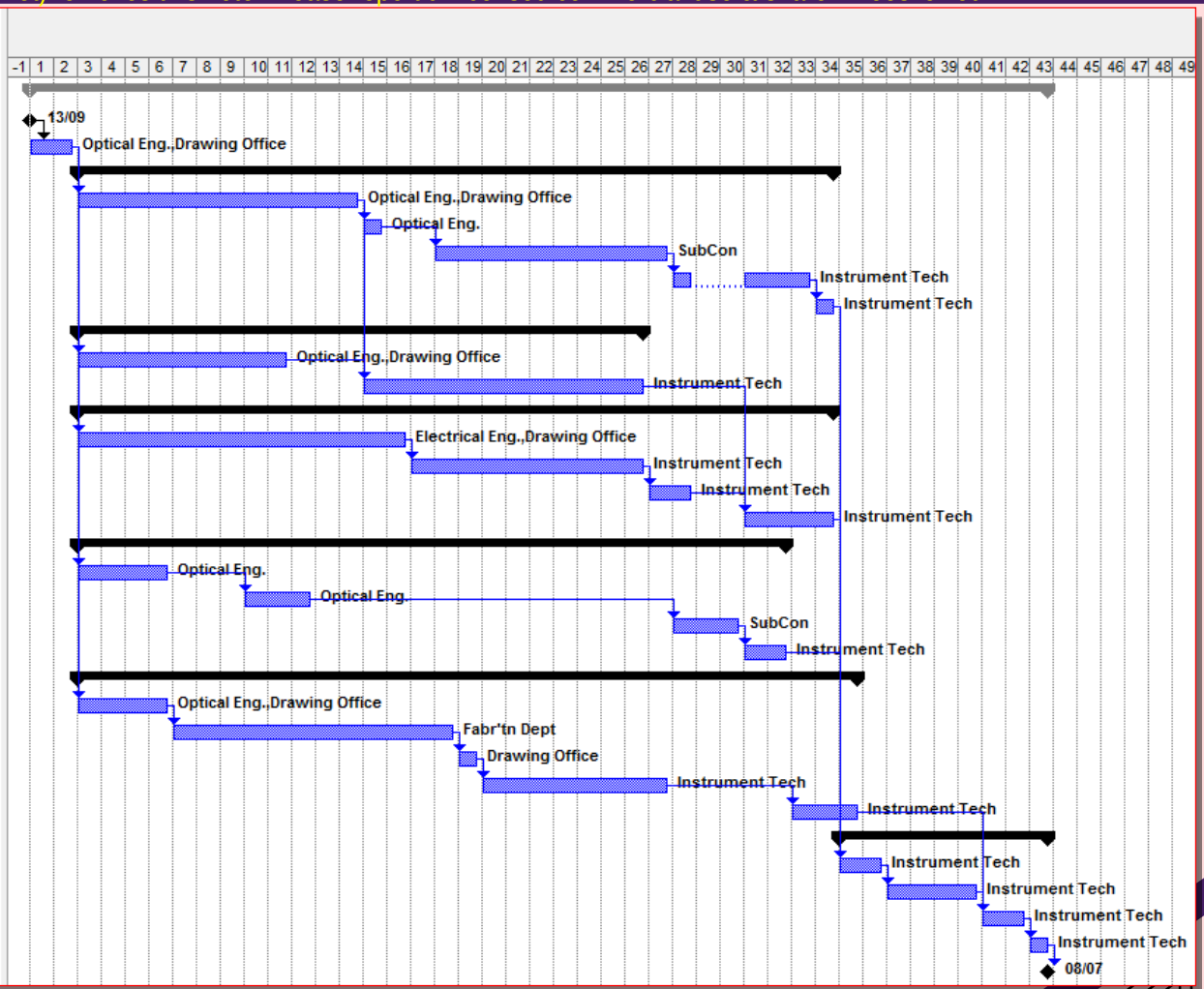
Task Name	Task Short Name	evelin Can Split	Leveling Delay	Duration	Work	Total Cost
Lunar Imaging System	**LIS**	**No**	**0 edays**	**215 days**	**5,440 hrs**	**£394,984**
Start-MS	S	No	0 edays	0 days	0 hrs	£0
Outline Design	OutD	No	0 edays	2 wks	120 hrs	£9,277
Optics Sub-System		**No**	**0 edays**	**160 days**	**1,200 hrs**	**£88,326**
Optics Design	OD	No	0 edays	12 wks	560 hrs	£42,210
Lens System Parameters	LSPs	No	0 edays	1 wk	40 hrs	£3,363
Lens Fabrication	LensFab	No	14 edays	10 wks	400 hrs	£30,000
Optics Assembly	OA	Yes	0 edays	4 wks	160 hrs	£10,202
Optics Test	OT	No	0 edays	1 wk	40 hrs	£2,551
Focusing Mechanics Ss		**No**	**0 edays**	**120 days**	**880 hrs**	**£61,802**
Focusing Mechanics Design	FMD	No	0 edays	9 wks	400 hrs	£31,195
Focusing Mechanics (Purchase	FMP	No	0 edays	12 wks	480 hrs	£30,607
Electronics Ss		**No**	**0 edays**	**160 days**	**1,240 hrs**	**£88,821**
Electronics Design	ED	No	0 edays	14 wks	600 hrs	£48,011
Electronics Fabrication	EFab	No	0 edays	10 wks	400 hrs	£25,506
Electronics Test	ET	No	0 edays	2 wks	80 hrs	£5,101
ElectroServo Preparation for Int	ESI	No	14 edays	4 wks	160 hrs	£10,202
Laser RangeFinder Ss		**No**	**0 edays**	**150 days**	**480 hrs**	**£37,644**
Laser Ranging System Tender	LRST	No	0 edays	4 wks	160 hrs	£13,453
Laser Generator (Purchase)	LGP	No	21 edays	3 wks	120 hrs	£10,090
Laser Fabrication	LasFab	No	105 edays	3 wks	120 hrs	£9,000
Laser Preparation for Integratior	LPI	No	0 edays	2 wks	80 hrs	£5,101
Image Buffer XSO		**No**	**0 edays**	**165 days**	**1,160 hrs**	**£86,158**
Image Storage Design	ISD	No	0 edays	4 wks	200 hrs	£15,191
Image Store Fabrication	ISFab	No	0 edays	12 wks	480 hrs	£40,360
Image Store As-Built Drawings	ISABD	No	0 edays	1 wk	40 hrs	£2,551
XSO Assembly	XA	No	0 edays	8 wks	320 hrs	£20,405
XSO Review	XR	No	35 edays	3 wks	120 hrs	£7,652
Intg'tn & Proving Phase		**No**	**0 edays**	**45 days**	**360 hrs**	**£22,955**
Assemble Sub-Systems	ASS	No	0 edays	2 wks	80 hrs	£5,101
System Test	LISST	No	0 edays	4 wks	160 hrs	£10,202
Accept Test	LISAT	No	0 edays	2 wks	80 hrs	£5,101
Field Installation & Calibration	FIC	No	0 edays	1 wk	40 hrs	£2,551
Finish-MS	F	No	0 edays	0 days	0 hrs	£0



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- Consultancy & training in
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  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 7

Lesson 7: Tracking Progress And Amending Assignments

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Objectives

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- Set calculation and other options in preparation to track versus the baseline
  - Decide whether to track with durations or work and at what level
- Track status and adjust the un-executed portion of the plan for revised intentions
  - Track with %Complete, or with task dates or time-phased Actual Work
  - Track costs via resource usage (Or disable calculations & track manually)
  - Revisit the effects of Task-Type and Effort-Driven on tracking
- Using filters and manipulating the plan
  - EG to replace resources part way through a project
- Reporting, Displaying project status and extract (and importing) information
  - Assess variances
  - Analyse the project using Earned Value Analysis
  - Using DDE* to link to other programs such as Excel
- Track the Case-Study through its first 7 months

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* Dynamic Data Exchange

Development and Maintenance of Project Baseline

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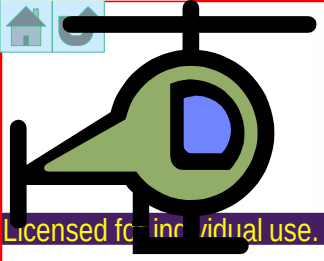

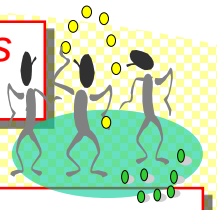

Needs or *Objectives*
Strategic Risk

Programme or S.A. Project

Deliverables
Bill of Materials & Quality Description

Scope Development

Schedule Development

Task List (WBS) & Work Assignments (OBS)

Project

Dependencies

Resourcing

Schedule Baseline

Scope & Responsibility Baseline

Cost Baseline

Cost & Resource Estimating

Response to *Tactical Risk*

Finalised Cost/ Time/ Scope baselines

Monitoring, Tracking & Control

Contents: Preparing To Track

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Preparing to Track and Tracking
- Calculation Options
- High level tracking
- Low level tracking

- Tracking Costs
- Status, Filters and amending the plan's contents
- Using Earned Value
- MSPJ capabilities for data reporting, exporting and exchanging

Preparing to Track

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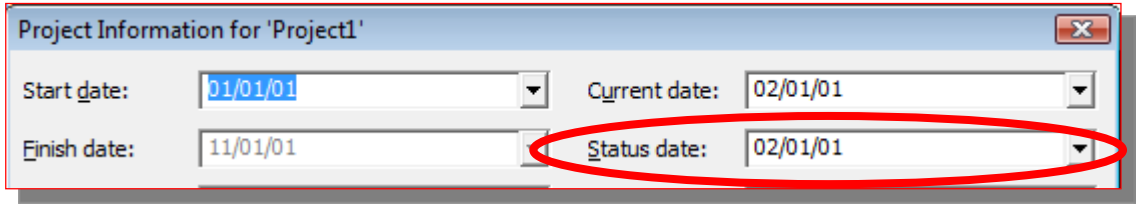
- Tracking requires a status date – Today by default
  - *Project | Project Information | Status Date*



- Decision about what level to track at
  - Project progress level or at Task level or at Assignments level
  - Time-phased assignment level is most detailed
- Tracking also requires set-up of tracking defaults
  - Entering data causes instantaneous recalculation of schedule and cost
  - You can make re-calculation manual *Tools | Options | Calculation | Mode: Manual*
    - Then use Shift+F9 to calculate the project (F9 for all open projects)
    - Other defaults to be set in *Tools | Options | Calculation*

Tools | Options | Calculation

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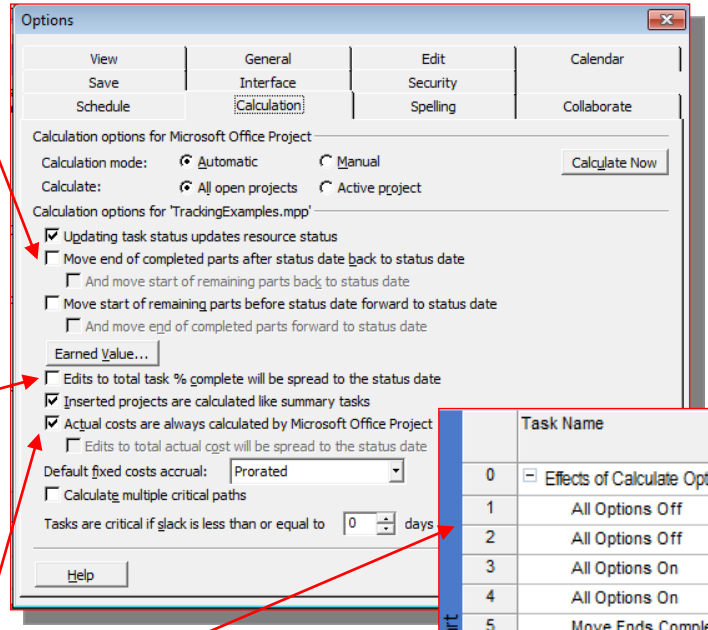
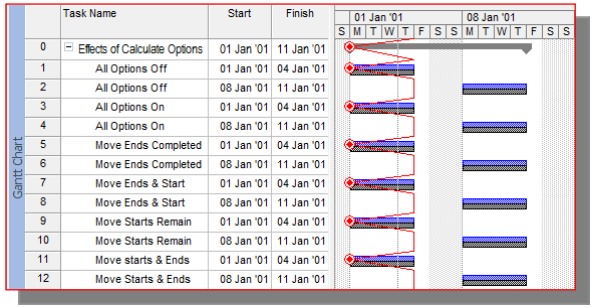
- Cost calculations and how work done ahead of baseline or behind base-line is rescheduled

MSPJ will move tasks around status date for work done out of schedule

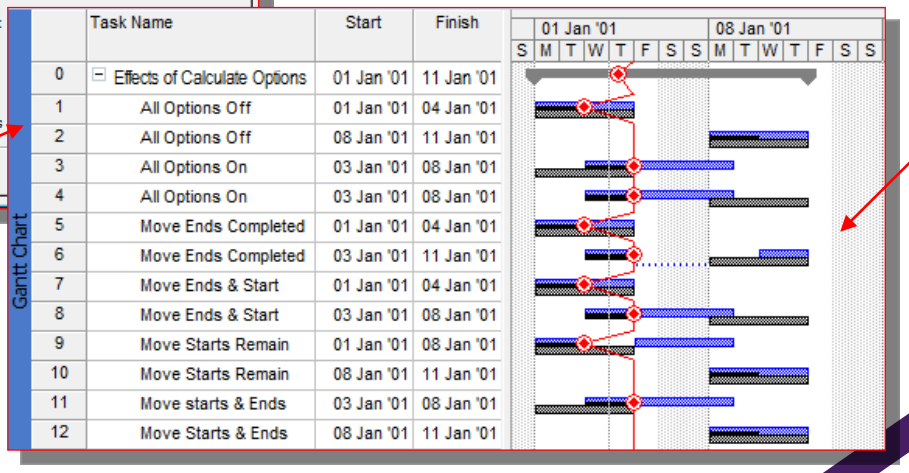
%Complete spread over whole duration or only up to status date

MSPJ Calculates ALL actual variable costs or you do





Dates adjusted to reflect start/ finish base on tracking



Status tracked as 50% on dates, even in future

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See 'Effects of Calculate Options.mpp'

High-Level Versus Low-Level Tracking

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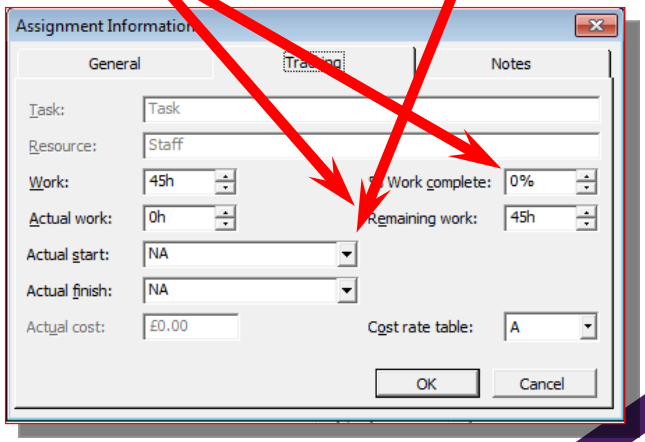
- MSPJ's flexible tracking options have different strengths and weaknesses
  - High-level project and task tracking is quick but lacks granularity
    - Update entire project to record progress to plan!
    - Or track dates and durations on selected tasks or assignments
    - Or track work done and to go on selected tasks or assignments
  - Lowest-level tracking
    - Set time-phased assignment actual and remaining work
- Level of tracking can be Summary task, Task, Assignment or Time-phased assignment
  - Tasks (assignments) can be tracked at different levels of detail
    - Even at different tracking times



Project Guide Set-Up Tracking Wizard

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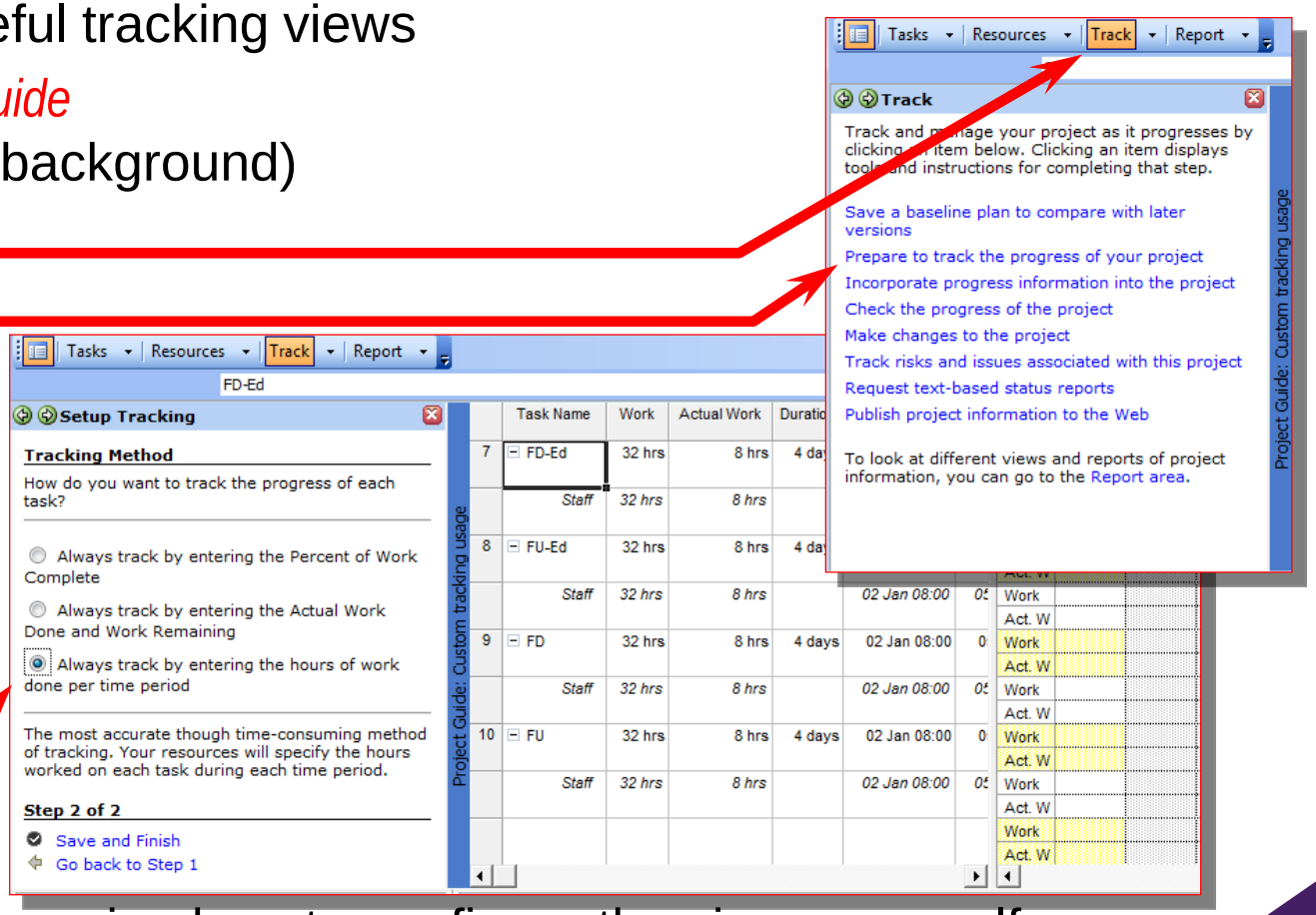
- Project guide contains useful tracking views
  - *View | Toolbars | Project Guide*
    (or Right-Click toolbar background)
  - Track
  - Prepare…
  - Tasks don't have to have been resourced on entry, BUT…
    - Only resourced tasks have *Work*
  - But you are better off knowing how to configure the views yourself



Centralised or Distributed Data-Entry

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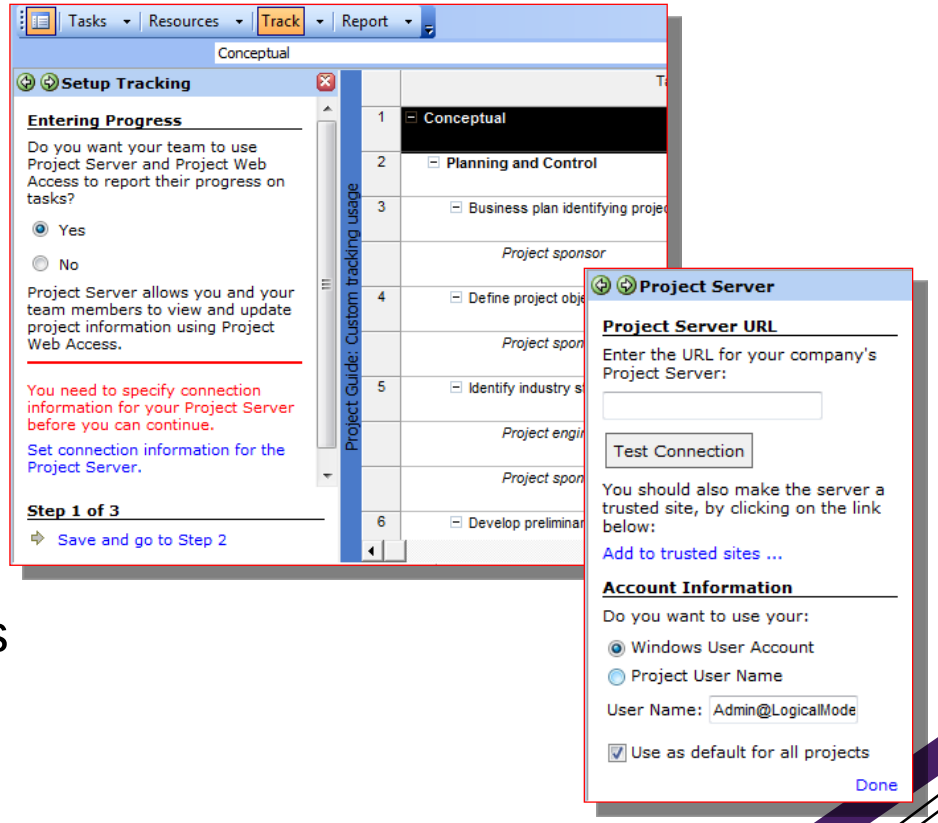
- Project Server and Web Access allow team members to submit timesheet data
  - Integrated into plans for approval and then 'locked'
  - Limited capability via eMail (MAPI) also useful
    - Has to be downloaded from Microsoft® Office® Web-site
- Collected information may be entered centrally
  - Not really an 'administrative function' due to MSPJ's complexity and need to revise assignments and allocations



Information To Track

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- Data entered can be time based or work based
- Time/ Duration tracking uses:
  - % Complete (of duration),
  - Actual and remaining duration
  - Actual Start/ Finish – Start requires a %age while Finish = 100%

- Work based tracking uses:
  - Actual work complete and remaining
  - % Work Complete
    - Independently track Physical % Complete for EV
  - Time-phased work complete

Amounts Are Recalculated & Tasks Rescheduled

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- Any data tracked (and planned) at a 'higher' level (EG Task) is spread across lower levels (EG Assigned Resources)
  - Data entered at lower levels (EG Time-phased assignment) is aggregated
  - % Complete is spread across task duration OR spread up-to status date
    Tools | Options | Calculate | Edits to total task % complete will be spread to the status date
- Remaining work subject to Task-Type and Work, Resource, Duration rules
- By default tracking with %complete (of duration) calculates actual cost and work
  - Recalculates remaining cost and work
  - To manually enter actual and remaining cost and work
    Clear *Tools | Options | Calculation | Updating task status updates resource status*
  - Often useful for control of what actually happened rather than was planned

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Task-Type Rules Apply To Tracking

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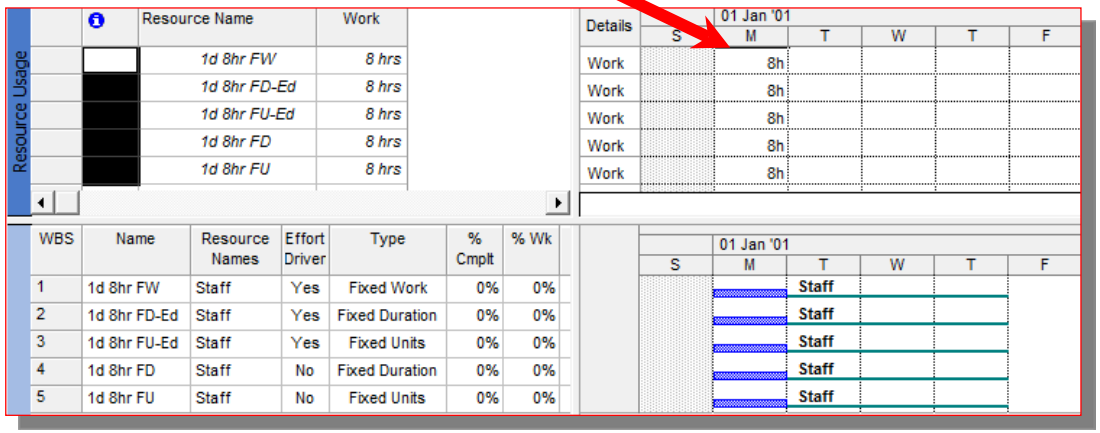
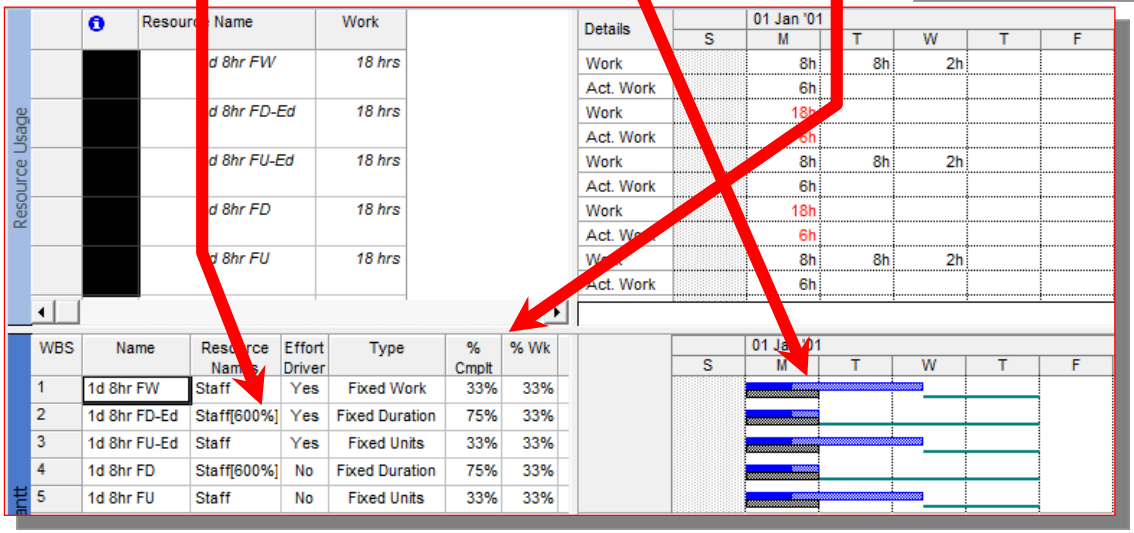
- A 1d duration, 8hrs work task has 12hrs left after 6hrs effort

Actual work: 6 Remaining work: 12



- Results reflected in Percentages and Units and Durations



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See Mixed task Type Assignments UnBL.mpp

Preparing to Track

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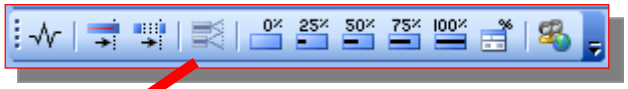
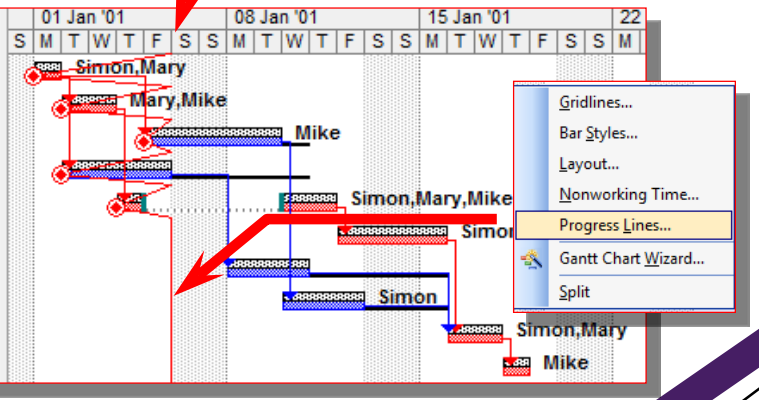
- Turn on the Tracking Tool-Bar if tracking at task level
  - % buttons assume “to plan”
  - Select table tracking, show baseline and show progress lines
    - By default a grey line is drawn at “Current Date”
    - Useful to set a Progress Line at Status date



Gantt Chart

	Task Name	Act. Start	Act. Finish	% Comp.	Phys. % Comp.	Act. Dur.	Rem. Dur.	Act. Cost	Act. Work
1	Define Need	NA	NA	0%	0%	0 days	1 day	£0.00	0 hrs
2	Internal Prep	NA	NA	0%	0%	0 days	2 days	£0.00	0 hrs
3	External Prep	NA	NA	0%	0%	0 days	3 days	£0.00	0 hrs
4	Get Materials	NA	NA	0%	0%	0 days	4 days	£0.00	0 hrs
5	Initial Build A	NA	NA	0%	0%	0 days	3 days	£0.00	0 hrs
6	Final Build A	NA	NA	0%	0%	0 days	2 days	£0.00	0 hrs
7	Initial Build B	NA	NA	0%	0%	0 days	3 days	£0.00	0 hrs
8	Initial Build C	NA	NA	0%	0%	0 days	3 days	£0.00	0 hrs
9	Integrate	NA	NA	0%	0%	0 days	2 days	£0.00	0 hrs
10	Deliver	NA	NA	0%	0%	0 days	1 day	£0.00	0 hrs



Tracking Choices – Crude: Project Level

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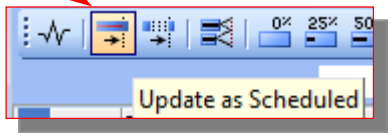
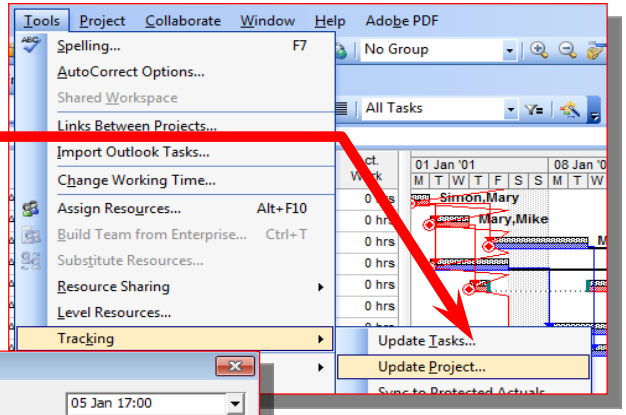
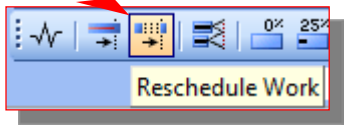
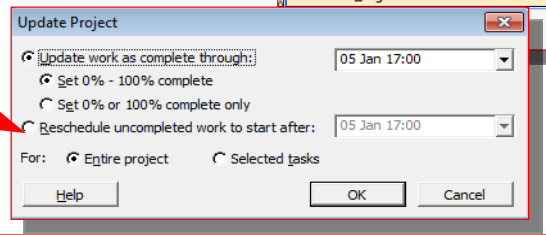
- All to plan? Then let MSPJ update whole project as scheduled!
  - Perhaps unlikely!
- Options for *Update Project* allow tracking using 0% 100% or time-based %-complete
- Tasks not completed can be re-scheduled after a defined date
  - Applies a global rig

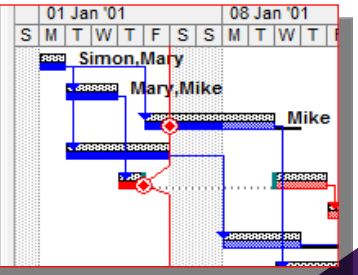








Task Name	Act. Start	Act. Finish	% Comp.	Phys. % Comp.	Act. Dur.	Rem. Dur.	Act. Cost	Act. Work
Define Need	01 Jan 08:00	01 Jan 17:00	100%	0%	1 day	0 days	£160.00	16 hrs
Internal Prep	02 Jan 08:00	03 Jan 17:00	100%	0%	2 days	0 days	£320.00	32 hrs
External Prep	05 Jan 08:00	NA	33%	0%	1 day	2 days	£80.00	8 hrs
Get Materials	02 Jan 08:00	05 Jan 17:00	100%	0%	4 days	0 days	£0.00	0 hrs
Initial Build A	04 Jan 08:00	NA	33%	0%	1 day	2 days	£240.00	24 hrs
Final Build A	NA	NA	0%	0%	0 days	2 days	£0.00	0 hrs
Initial Build B	NA	NA	0%	0%	0 days	3 days	£0.00	0 hrs



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Tracking At Task Level With Durations

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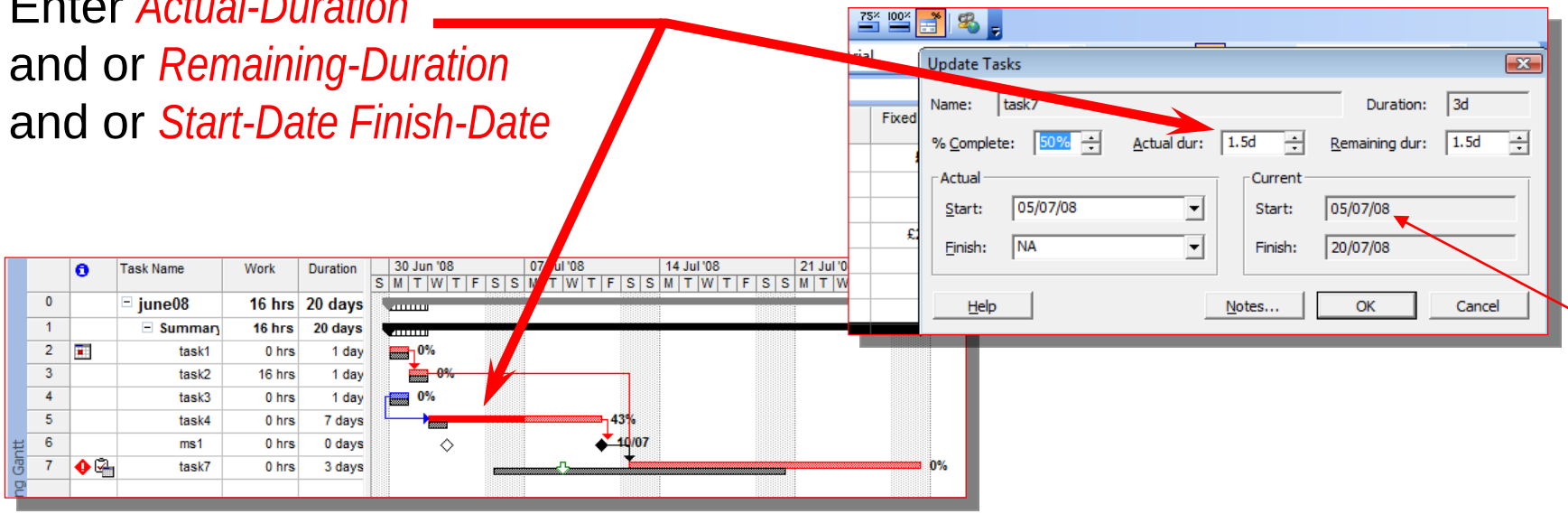
- Enter *Actual-Duration*
  and or *Remaining-Duration*
  and or *Start-Date Finish-Date*



NOTE: MSPJ changes *Current* to match *Actual* when tracked.
(Variances are only calculated against *Baseline*)
MSPJ also calculates %complete from Dates

- Suits plans created without resource assignments
  - Tracking *Work* is possible where the plan was created with resource assignments

Tracking Tasks: Actual Start & Finish Dates

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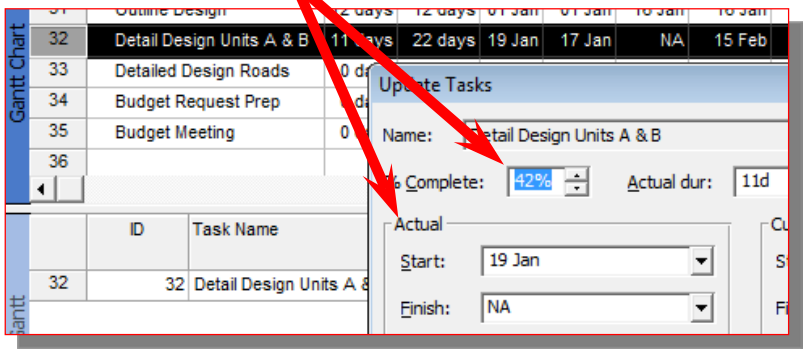
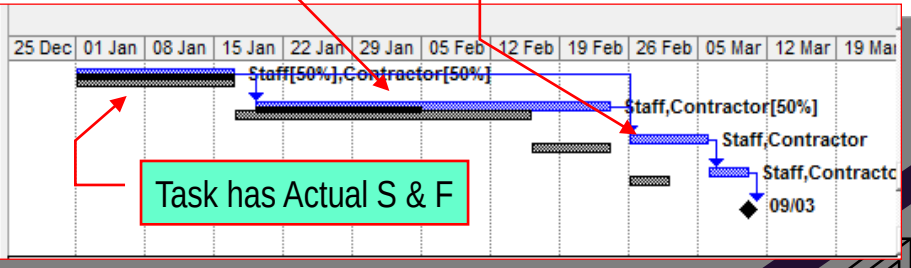
- Set a task's Actual Start and a %Complete
  - Actual Finish sets % Complete to 100%
  - Suits tasks NOT planned with resources



- *"Current" Start* (or *Finish*) *Date* really means 'Expected…'
  - Original (previous) can be saved into a Baseline
  - Variances are calculated as 'Expected' – Baseline
- Future 'Current' shows affect of progress to date

	Task Name	Actual Duration	Baseline Dur.	Actual Start	Baseline Start	Actual Finish	Baseline Finish	Actual Work	Baseline Work	Actua Cost	Baseline Cost
31	Outline Design	12 days	12 days	01 Jan	01 Jan	16 Jan	16 Jan	96 hrs	80 hrs	£480	£0
32	Detail Design Units A & B	11 days	22 days	19 Jan	17 Jan	NA	15 Feb	88 hrs	208 hrs	£880	£0
33	Detailed Design Roads	0 days	6 days	NA	16 Feb	NA	23 Feb	0 hrs	48 hrs	£0	£0
34	Budget Request Prep	0 days	4 days	NA	26 Feb	NA	01 Mar	0 hrs	32 hrs	£0	£0
35	Budget Meeting	0 days	0 days	NA	01 Mar	NA	01 Mar	0 hrs	0 hrs	£0	£0
36											

Gantt Chart



Task has Actual S & Current Finish

Task has Current S&F

Task has Actual S & F

Tracking Task Work

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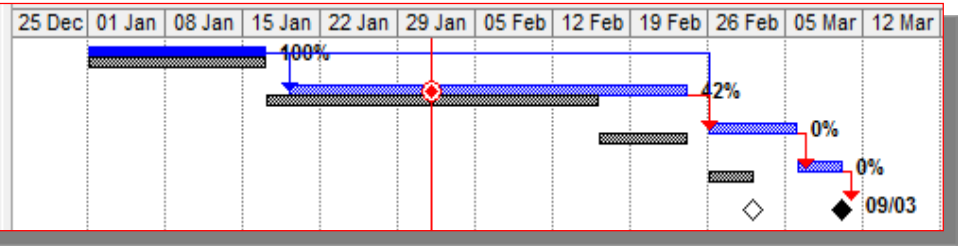
- Display *Task Usage* or *Tracking Gantt*
  - *Table Work*, Columns *Actual* and *Remaining* and *% W Comp.*
  - When *Actual* is entered *Remaining* and *% W Comp.* are recalculated
    - The value entered can be *% W Comp.*
    - Recalculation can be disabled by unchecking
      Tools | Options | Calculation-Tab | Updating task status updates resource status

Tracking Gantt

	Task Name	Work	Baseline	Variance	Actual	Remaining	% W. Comp.
31	Outline Design	96 hrs	80 hrs	16 hrs	96 hrs	0 hrs	100%
32	Detail Design Units A & B	208 hrs	208 hrs	0 hrs	88 hrs	120 hrs	42%
33	Detailed Design Roads	96 hrs	48 hrs	48 hrs	0 hrs	96 hrs	0%
34	Budget Request Prep	64 hrs	32 hrs	32 hrs	0 hrs	64 hrs	0%
35	Budget Meeting	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	0%



- Work entered at task-level is spread across assigned resources & spread across task duration or to status date
  - Work entered at Summary Task level is spread across included tasks

Tracking Choices: Using Percentages

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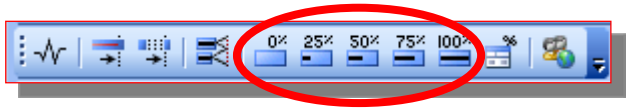
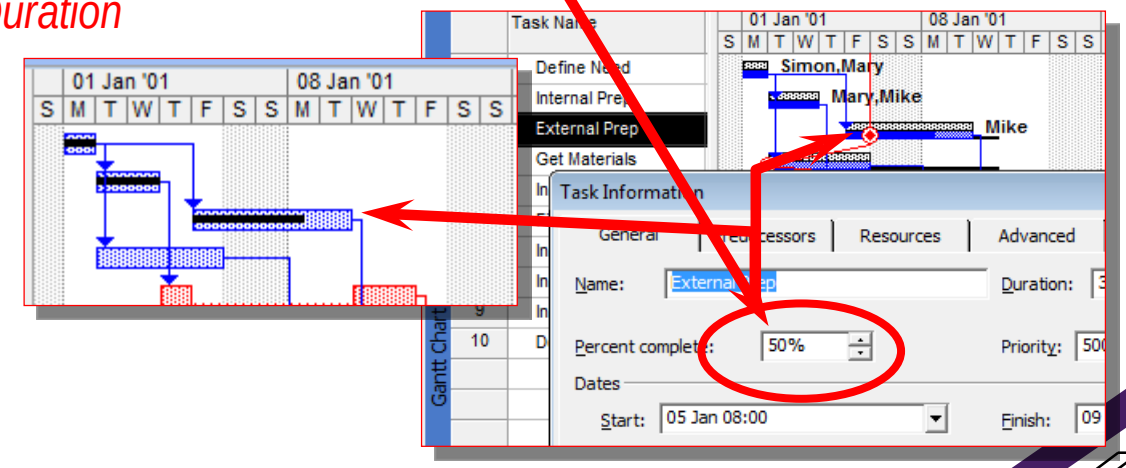
- Update of percentage can be at task or assignment level

- For task *View | More Views | Gantt Chart* then *View | Tables | Work* (or *Tracking*)
  - Use the Tracking toolbar



  - Or *Task Information* then enter *Percent Complete*
    - *Percent Complete* is percent of *Duration*
  - Progress shown on standard or *Tracking Gantt*
  - *Tools | Options | Calculation | ...Spread evenly or to status date*



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Tracking Percentages For Assignments

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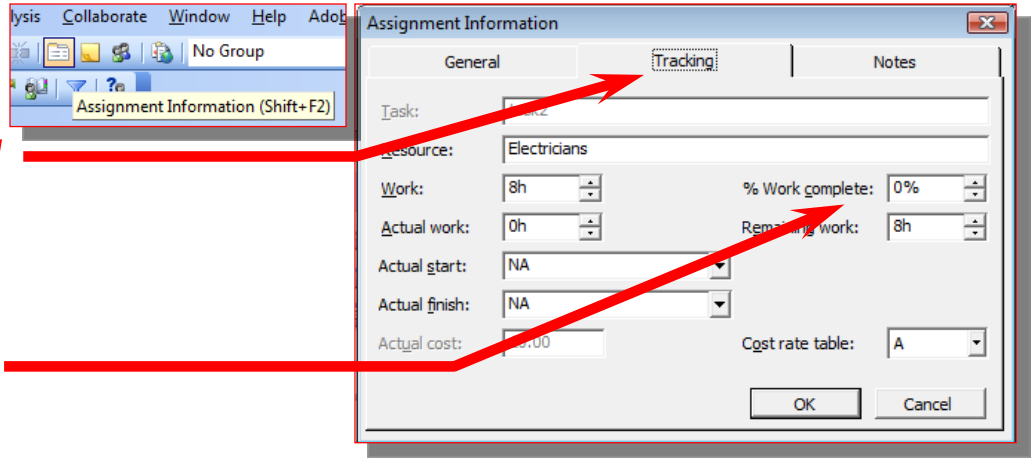
- Tracking percentage via the assignments is a more detailed approach than percent duration of tasks
  - % Work Complete (as opposed to % Complete [of duration])
  - *View | {Task,Resource} Usage* and select an assignment
    - The resource row for a task or task row for a resource
  - Which sheet to use reflects how status data is collected by {Task | Person}
  - *Double-Click* or select and click *Assignment Information | Tracking*
  - *Enter % Work Complete* by the specific resource on this task
    - Work is spread…
  - Always set *Project | Project Information | Status Date* for the update date



Tracking Assignment Work Done and Remaining

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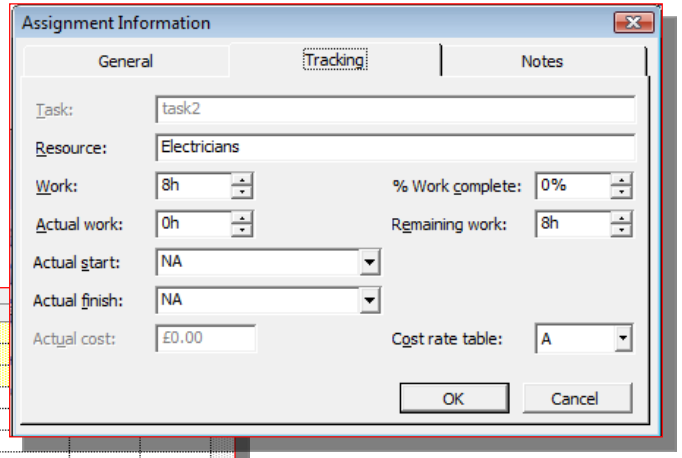
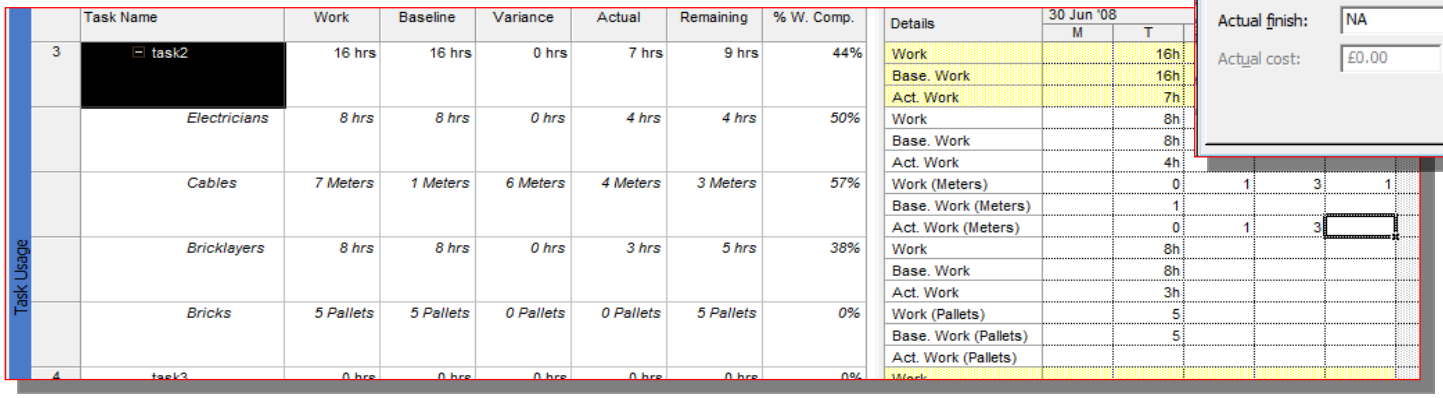
- Tracking work can be applied at 'whole assignment' level or time-phased
- Display *View | {Task, Resource} Usage*
  - For 'whole assignment' enter data to the table's columns or double-click and enter to the Assignment Information





- The spreadsheet portion of the view gives control at time-phased level

Tracking Assignment Work

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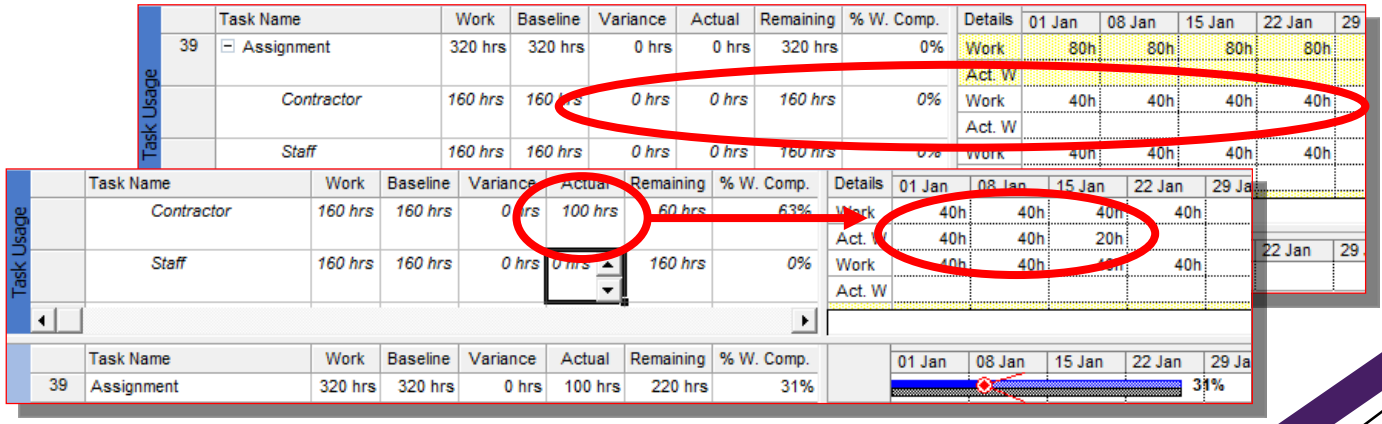
- Work entered at assignment-level is
  - Spread across the tasks time-phasing (Duration or to status date)
  - Aggregated upwards for task reporting
- Display *Task Usage* | *Table Work*, Columns *Actual* and *Remaining*
  - Enter any of *Actual* and *Remaining* and *% W Comp.*
    - Recalculation of *% W Comp.* (or other values) is applied



Tracking Assignment Work: Time-Phased

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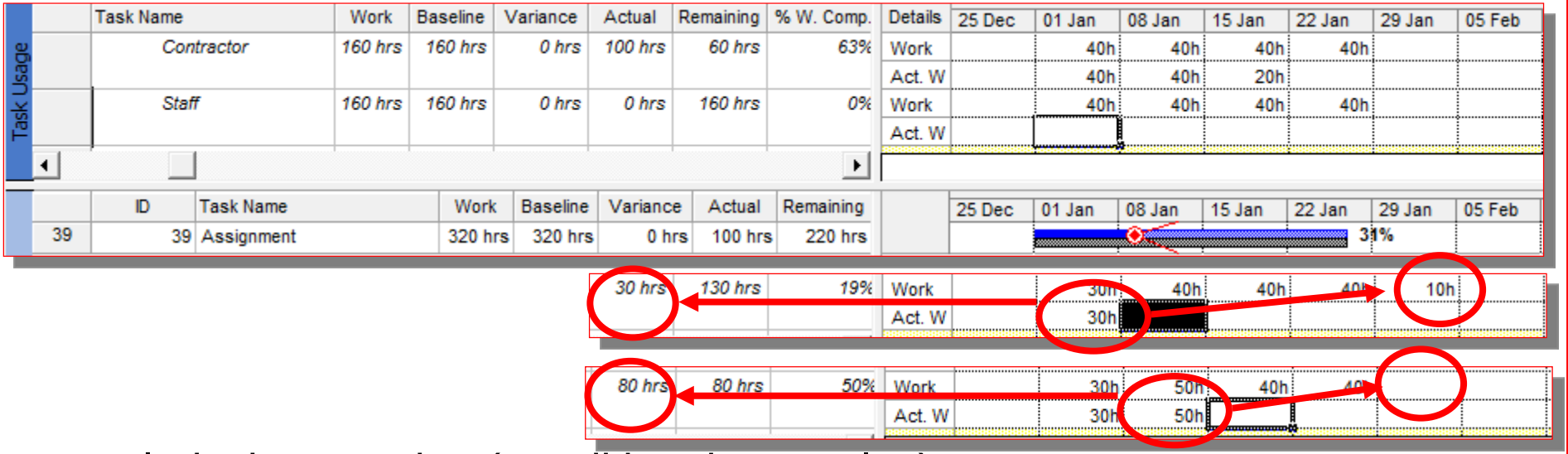
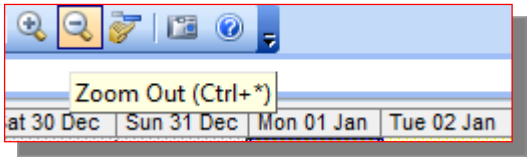
- Data tracked as time-phased entries gives most control
  - Project Web Access shares burden with team when submitting time-sheets



- Set granularity by zooming (or editing time-scales)



Work Translates Into Duration

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- How tracking actual results affects what is remaining depends on Task-Type
  - Progress ahead of expectation reduces future work-load
- FW task with extra work done on day 2
  - Duration reduced on Day 4

	Task Name	% Comp.	Phys. % Comp.	Act. Dur.	Rem. Dur.	Act. Cost	Act. Work
7	4d Dur before reso	35%	0%	1.39 days	2.61 days	£1,670.00	167 hrs
8	FW	35%	0%	1.39 days	2.61 days	£334.0	33.4 hrs
	R1					*£11 .33*	*11.13 hrs*
	R2					*£111.33*	*11.13 hrs*
	R3					*£111.33*	*11.13 hrs*

Task-Type set to Fixed Work

Details	01 Jan '01 F	S	S	M	T	W	T	F
Work				120h	120h	120h	120h	
Act. W				120h	47h			
Work				24h	24h	24h	24h	
Act. W				24h	9.4h			
Work				8h	8h	8h	8h	
Act. W				8h	3.13h			
Work				8h	8h	8h	8h	
Act. W				8h	3.13h			
Work				8h	8h	8h	8h	

8	FW	41%	0%	1.65 days	2.35 days	£422.67	42.27 hrs
	R1					*£200.00*	*20 hrs*
	R2					*£111.33*	*11.13 hrs*
	R3					*£111.33*	*11.13 hrs*

Work	24h	28h	24h	20h	
Act. W	24h	18.27h			
Work	8h	12h	8h	4h	
Act. W	8h	12h			
Work	8h	8h	8h	8h	
Act. W	8h	3.13h			
Work	8h	8h	8h	8h	
Act. W	8h	3.13h			

Work Hours Recalculated

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- FD task with extra work done on day 2
  - Day 3 & 4 work-load reduced evenly

Task-Type set to Fixed Duration

Task Usage

10	FD	35%	0%	1.39 days	2.61 days	£334.00	33.4 hrs	Work	24h	24h	24h	24h			
								Act. W	24h	9.4h					
	R1					£111.33	11.13 hrs	Work	8h	8h	8h	8h			
								Act. W	8h	3.13h					
	R2					£111.33	11.13 hrs	Work	8h	8h	8h	8h			
								Act. W	8h	3.13h					
	R3					£111.33	11.13 hrs	Work	8h	8h	8h	8h			
								Act. W	8h	3.13h					

Task Usage

10	FD	41%	0%	1.65 days	2.35 days	£422.67	42.27 hrs	Work	24h	28h	22h	22h			
								Act. W	24h	18.27h					
	R1					£200.00	20 hrs	Work	8h	12h	6h	6h			
								Act. W	8h	12h					
	R2					£111.33	11.13 hrs	Work	8h	8h	8h	8h			
								Act. W	8h	3.13h					
	R3					£111.33	11.13 hrs	Work	8h	8h	8h	8h			
								Act. W	8h	3.13h					

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Recap: Tracking Actual Work At Assignment Level 1/5

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- Hours recorded at resource level are spread over the assignment
  - Aggregates to summary level

- 14hrs entered at assignment level:
  - Spread across time-phase
  - Aggregated upwards

- 3, 3 and 3hrs entered at time-phase assignment level:
  - Aggregated to 9hrs at assignment
  - 9hr also then aggregated upwards into task's 29

						Act. Cost	Act. Work
7	4d Dur before reso	7%	0%	0.41 days	5.46 days	£290.00	29 hrs
8	FW	26%	0%	1.53 days	4.35 days	£290.00	29 hrs
	R1					*£140.00*	*14 hrs*
	R2					*£60.00*	*6 hrs*
	R3					*£90.00*	*9 hrs*

14 + 6 + 9 = 29

14 becomes 8 and 6

Details	01 Jan '01 F	S	S	M	T	W	T	F	S	S	08 Jan '01 M
Work				115h	115h	115h	120h	8h			7h
Act. W				17h	9h	3h					
Work				19h	19h	19h	24h	8h			7h
Act. W				17h	9h	3h					
Work				8h	8h	8h	8h				
Act. W				8h	6h						
Work				8h	8h	8h	8h				
Act. W				6h							
Work				3h	3h	3h	8h	8h			7h
Act. W				3h	3h	3h					

- Progress by R3 15hrs below expectations (FW)
  - Duration and work now extends into next week compared to baseline

7	4d Dur before reso	0%	0%	0 days	4 days	£0.00	0 hrs
8	FW	0%	0%	0 days	4 days	£0.00	0 hrs
	R1					*£0.00*	*0 hrs*
	R2					*£0.00*	*0 hrs*
	R3					*£0.00*	*0 hrs*

Work				120h	120h	120h	120h
Work				24h	24h	24h	24h
Work				8h	8h	8h	8h
Work				8h	8h	8h	8h
Work				8h	8h	8h	8h

Recap: Tracking Assignment Actual Work 2/5

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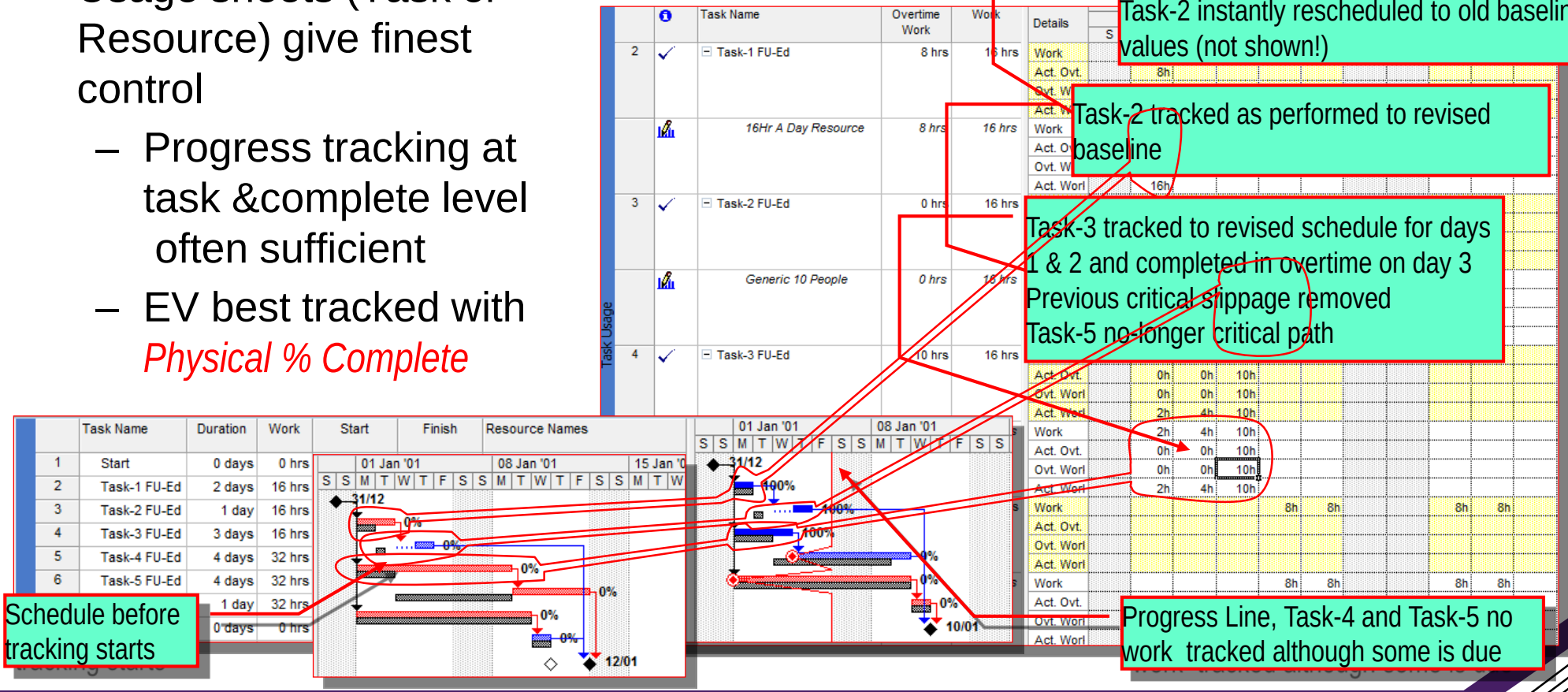
- Project status updates after each entry (by default)
- Usage sheets (Task or Resource) give finest control
  - Progress tracking at task &complete level often sufficient
  - EV best tracked with *Physical % Complete*



Recap: Tracking Assignment Actual Work 3/5

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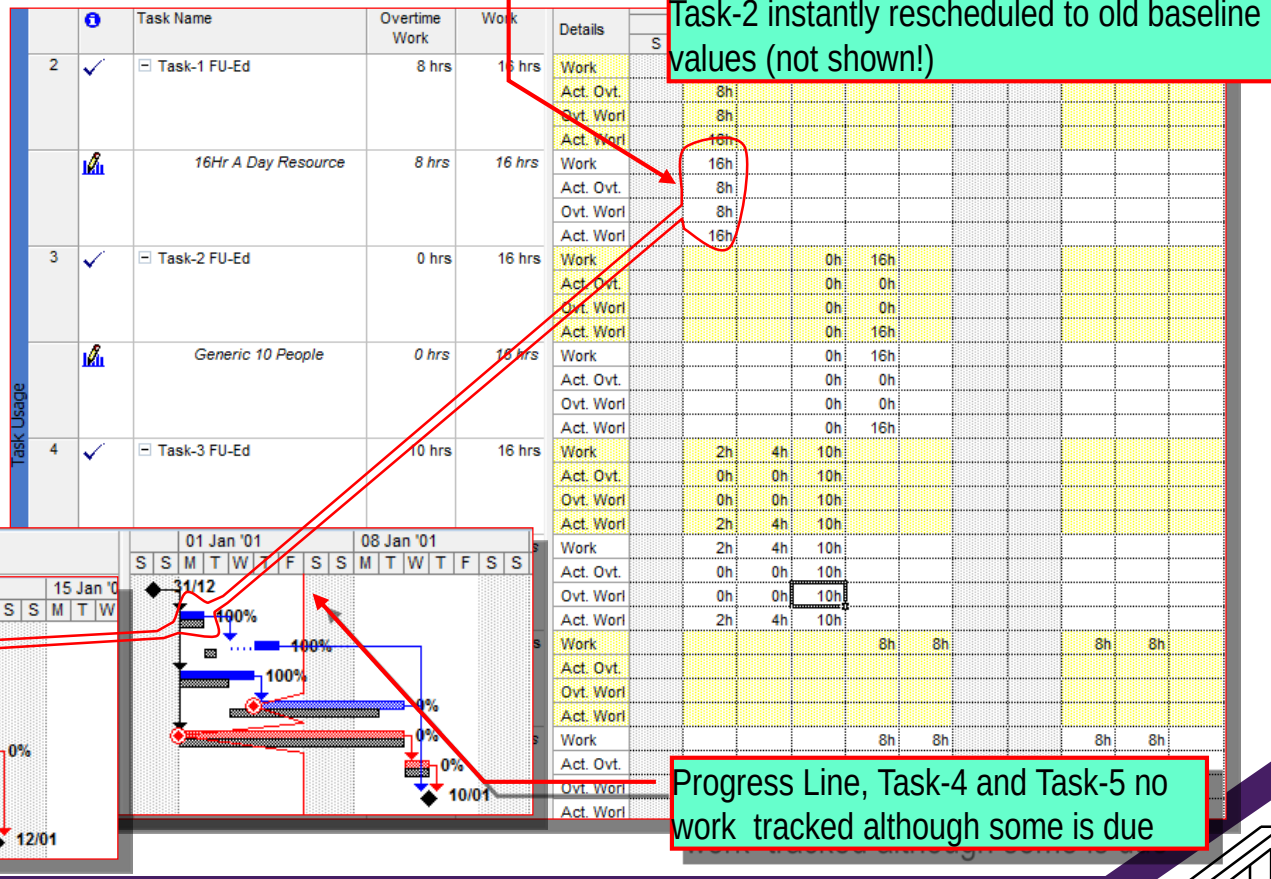
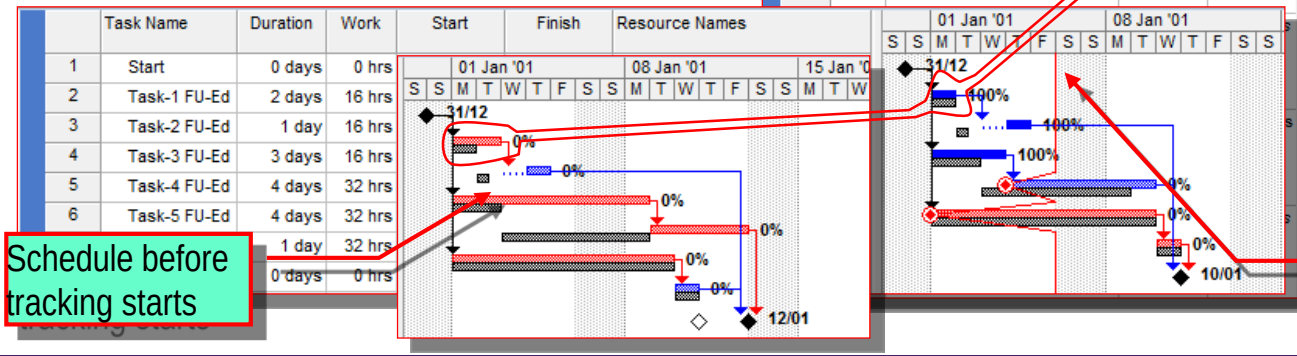
- Project status updates after each entry (by default)
- Usage sheets (Task or Resource) give finest control
  - Progress tracking at task &complete level often sufficient
  - EV best tracked with *Physical % Complete*

Task-1 completed in a day & recorded use of 8hrs overtime
Task-2 instantly rescheduled to old baseline values (not shown!)





Schedule before tracking starts

Progress Line, Task-4 and Task-5 no work tracked although some is due

Recap: Tracking Assignment Actual Work 4/5

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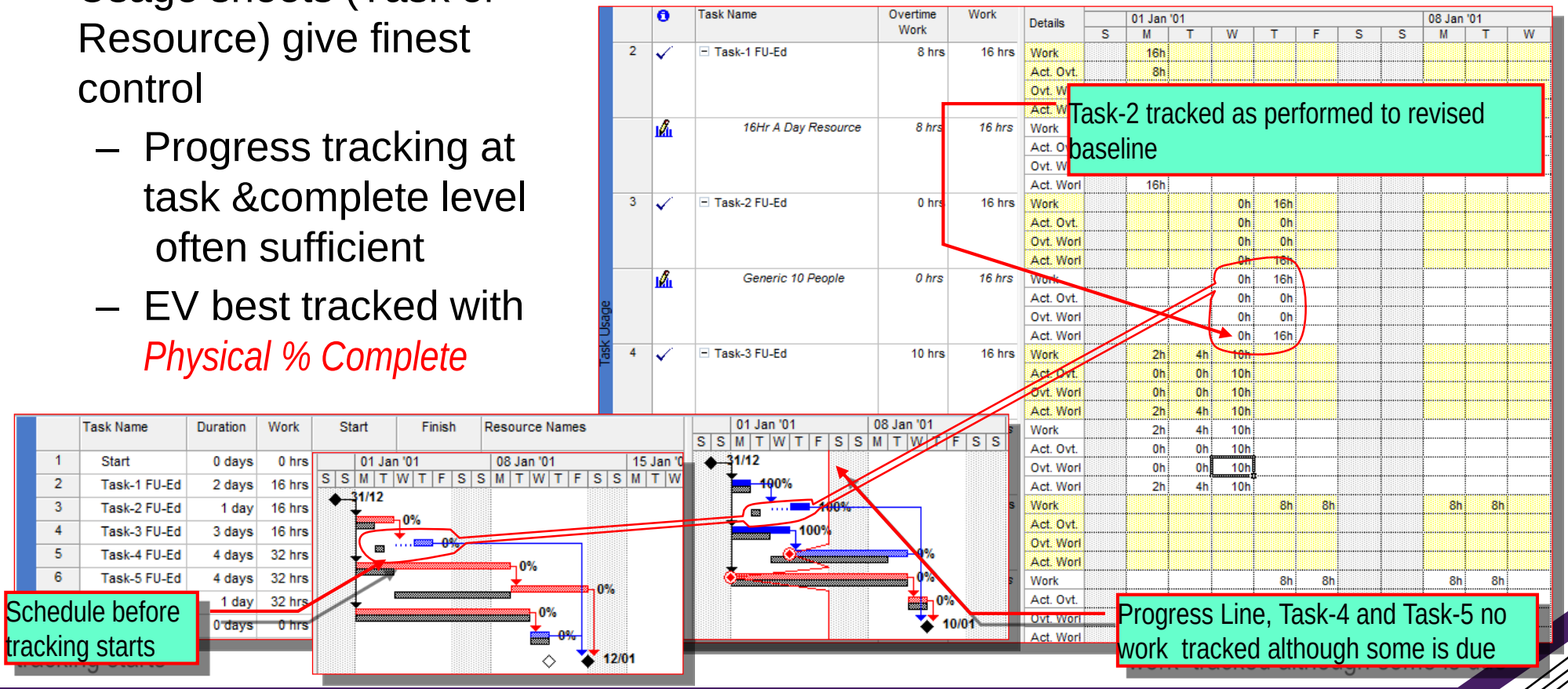
- Project status updates after each entry (by default)
- Usage sheets (Task or Resource) give finest control
  - Progress tracking at task &complete level often sufficient
  - EV best tracked with *Physical % Complete*



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Recap: Tracking Assignment Actual Work 5/5

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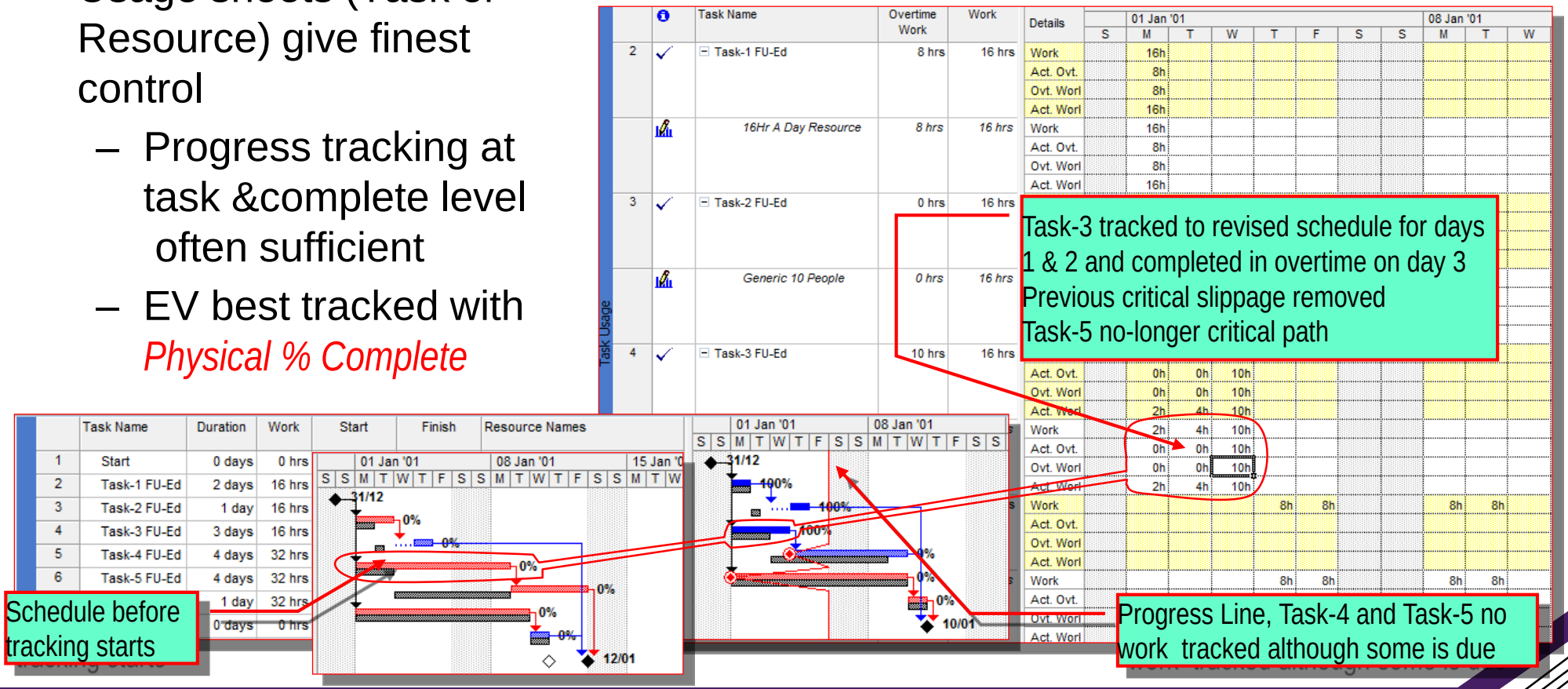
- Project status updates after each entry (by default)
- Usage sheets (Task or Resource) give finest control
  - Progress tracking at task &complete level often sufficient
  - EV best tracked with *Physical % Complete*



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Contents: Tracking Costs

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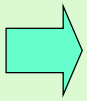
- Preparing to Track and Tracking
  - Calculation Options
  - High level tracking
  - Low level tracking


Tracking Costs

- Status, Filters and amending the plan's contents
- Using Earned Value
- MSPJ capabilities for data reporting, exporting and exchanging

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Accounting

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- Determine cost to the organisation of project activities
  - Best if drawn from finance system
    - PM often has to record data themselves ☹
- Record staff-time from time-recording systems
- Record materials and stores used
- Other direct expenses
  - EG travel, subsistence, consultancy, sub-contractors, legal fees
- If booking systems are not used honestly then all reporting and future estimating is compromised
  - NEVER disincentives the accurate recording of task hours and materials
  - Even if the news is unwelcome

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Tracking Costs

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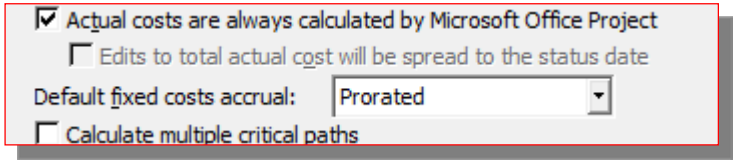
- Task + Resource = Assignment
  - Assignment * Rates = Cost
  - ∑ (Time-phased costs = cash-flow and cumulative costs)
- By default costs are calculated from resources used
  - Turned off by *Tools | Options | Calculation-Tab | Actual Costs Are **Always** calculated….*
  - Costs can now be manually entered
  - Entered costs are spread across task duration or to status date



- If MSPJ is calculating variable costs then cost entry is restricted
  - *Costs can be edited on completed task*
- Task costs entered via *View | Task Usage, View | table | Cost*
  - Assignment costs entered via *Format | Details | Actual Cost* (or Right-Click)

Cost Entry

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- If MSPJ calculates costs then
  - Fixed costs can be entered for a task (not assignments)

Task Usage

	Task Name	Cost	Fixed Cost	% Complete	Details	T	F	S
3	Business plan identifying proj	£4,500.00	£500.00	0%	Work	8h	8h	
					Cost	£900.00	£900.00	
					Act. Cost			
	Project sponsor	*£4,000.00*			Work	8h	8h	
					Cost	£800.00	£800.00	
					Act. Cost			

- ONLY when the task is complete can Act(ual). Cost be edited

Task Usage

		Task Name	Cost	Fixed Cost	% Complete	Details	04 Jan '04 T	F	S	S	M	T	W	T
3	✓	Business plan identifying proj	£4,890.00	£500.00	100%	Work	8h	8h			8h	8h	8h	
						Cost	£1,290.00	£900.00	£0.00	£0.00	£900.00	£900.00	£900.00	
						Act. Cost	£1,290.00	£900.00	£0.00	£0.00	£900.00	£900.00	£900.00	
		Project sponsor	*£4,390.00*			Work	8h	8h			8h	8h	8h	
						Cost	£1,190.00	£800.00	£0.00	£0.00	£800.00	£800.00	£800.00	
						Act. Cost	£1,190.00	£800.00	£0.00	£0.00	£800.00	£800.00	£800.00	

- When costs are manually entered time-phased cells allow entry
  - Entered costs are aggregated upwards

Task Usage

	Task Name	Cost	Fixed Cost	% Complete	Details	T	F	S
3	Business plan identifying proj	£5,190.00	£0.00	0%	Work	8h	8h	
					Cost	£1,990.00	£800.00	
					Act. Cost	£1,190.00		
	Project sponsor	*£5,190.00*			Work	8h	8h	
					Cost	£1,990.00	£800.00	
					Act. Cost	£1,190.00		

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Cost Fields

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- Tracking cost actually incurred may require turning MSPJ calculation off
  - Alternatively define a material cost of Currency to assign to tasks
  - All costs should be track-able via the resource units actually used

- See *Help | Table Of Contents | Reference | Field reference | Cost (Task Field) Edits to Total Cost Will be Spread…*

Contents: Status and Filters

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- Preparing to Track and Tracking
  - Calculation Options
  - High level tracking
  - Low level tracking
- Tracking Costs
- Status, Filters and amending the plan's contents
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Purpose Of Tracking Is To Displaying Status

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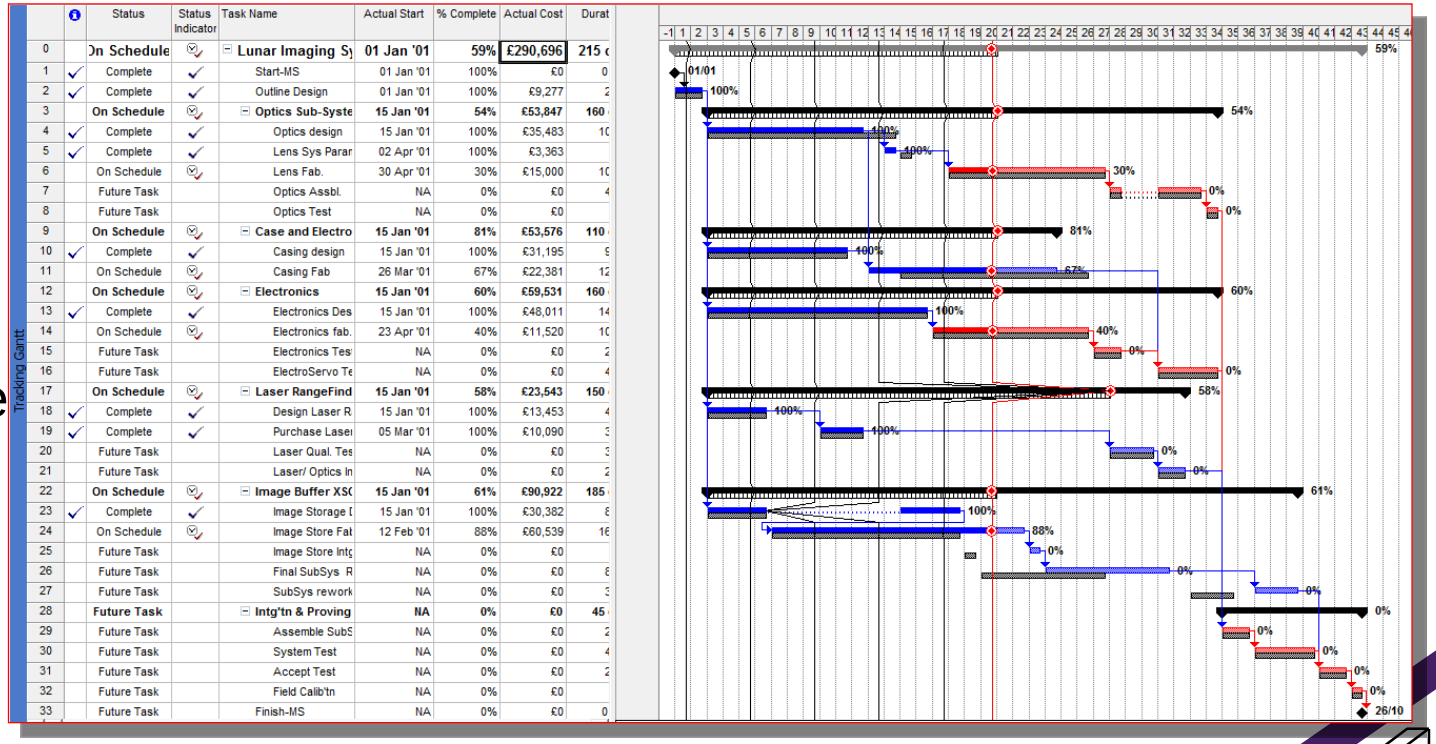
- Tracking information can be displayed in many ways
  - Useful for diagnosis during progress tracking
- Project status can be displayed as icons or text as assessed by MSPJ
- Variance to baseline shown graphically in Gantt-Charts
- Financial and resource variances are harder to detect
  - Use Earned Value (more shortly)
- Status is basis for adaptive, perfective or corrective actions



		Status	Status Indicator	Task Name	Actual Start	% Complete	Actual Cost	Durat
0		On Schedule		Lunar Imaging Sy	01 Jan '01	59%	£290,696	215
1	✓	Complete	✓	Start-MS	01 Jan '01	100%	£0	0
2	✓	Complete	✓	Outline Design	01 Jan '01	100%	£9,277	2
3		On Schedule		Optics Sub-Syste	15 Jan '01	54%	£53,847	160
4	✓	Complete	✓	Optics design	15 Jan '01	100%	£35,483	10
5	✓	Complete	✓	Lens Sys Parar	02 Apr '01	100%	£3,363	
6		On Schedule		Lens Fab.	30 Apr '01	30%	£15,000	10
7		Future Task		Optics Assbl.	NA	0%	£0	4
8		Future Task		Optics Test	NA	0%	£0	
9		On Schedule		Case and Electro	15 Jan '01	81%	£53,576	110
10	✓	Complete	✓	Casing design	15 Jan '01	100%	£31,195	9
11		On Schedule		Casing Fab	26 Mar '01	67%	£22,381	12
12		On Schedule		Electronics	15 Jan '01	60%	£59,531	160
13	✓	Complete	✓	Electronics Des	15 Jan '01	100%	£48,011	14
14		On Schedule		Electronics fab.	23 Apr '01	40%	£11,520	10
15		Future Task		Electronics Tes	NA	0%	£0	2
16		Future Task		ElectroServo Te	NA	0%	£0	4
17		On Schedule		Laser RangeFind	15 Jan '01	58%	£23,543	150
18	✓	Complete	✓	Design Laser R	15 Jan '01	100%	£13,453	4
19	✓	Complete	✓	Purchase Laser	05 Mar '01	100%	£10,090	3
20		Future Task		Laser Qual. Tes	NA	0%	£0	3
21		Future Task		Laser/ Optics In	NA	0%	£0	2
22		On Schedule		Image Buffer XSC	15 Jan '01	61%	£90,922	185
23	✓	Complete	✓	Image Storage I	15 Jan '01	100%	£30,382	8
24		On Schedule		Image Store Fat	12 Feb '01	88%	£60,539	16
25		Future Task		Image Store Intg	NA	0%	£0	
26		Future Task		Final SubSys R	NA	0%	£0	8
27		Future Task		SubSys rework	NA	0%	£0	3
28		Future Task		Intg'tn & Proving	NA	0%	£0	45
29		Future Task		Assemble SubS	NA	0%	£0	2
30		Future Task		System Test	NA	0%	£0	4
31		Future Task		Accept Test	NA	0%	£0	2
32		Future Task		Field Calib'tn	NA	0%	£0	
33		Future Task		Finish-MS	NA	0%	£0	0

Achievement Minus Baseline = Variance

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- Baseline ± Internal and External Change = Impact analysis
  - MSPJ says 'Planned Information' = 'Current baseline'
  - 'Actual' = Historically what has happened
  - 'Scheduled' = Actual plus Planned
  - 'Variance' = Scheduled minus Planned

- MSPJ Signs variances the OPPOSITE way around from EV ! ☹
  - "Remarks If the cost variance is negative, the cost for the assignment is currently under the budgeted, or baseline, amount. If the cost variance is positive, the cost for the assignment is currently over budget." sic

- Default Gantt *Variance Table* solely dates
  - Note: Variances in working days

-ve variance on early completion

Gantt Chart

	Task Name	Start	Finish	Baseline Start	Baseline Finish	Start Var.	Finish Var.
0	Engineering	05 Jan '04	10 May '06	01 Jan '04	08 May '06	2 days	2 days
1	Conceptual	05 Jan '04	23 Apr '04	01 Jan '04	21 Apr '04	2 days	2 days
2	Planning and	05 Jan '04	28 Jan '04	01 Jan '04	28 Jan '04	2 days	0 days
3	Business p	05 Jan '04	09 Jan '04	01 Jan '04	07 Jan '04	2 days	2 days
4	Define proj	15 Jan '04	23 Jan '04	08 Jan '04	14 Jan '04	5 days	7 days
5	Identify ind	13 Jan '04	15 Jan '04	15 Jan '04	21 Jan '04	-2 days	-4 days
6	Develop pr	13 Jan '04	18 Jan '04	15 Jan '04	21 Jan '04	-2 days	-3 days
7	Initial plann	21 Jan '04	21 Jan '04	21 Jan '04	21 Jan '04	0 days	0 days

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Project | Project Information | Statistics

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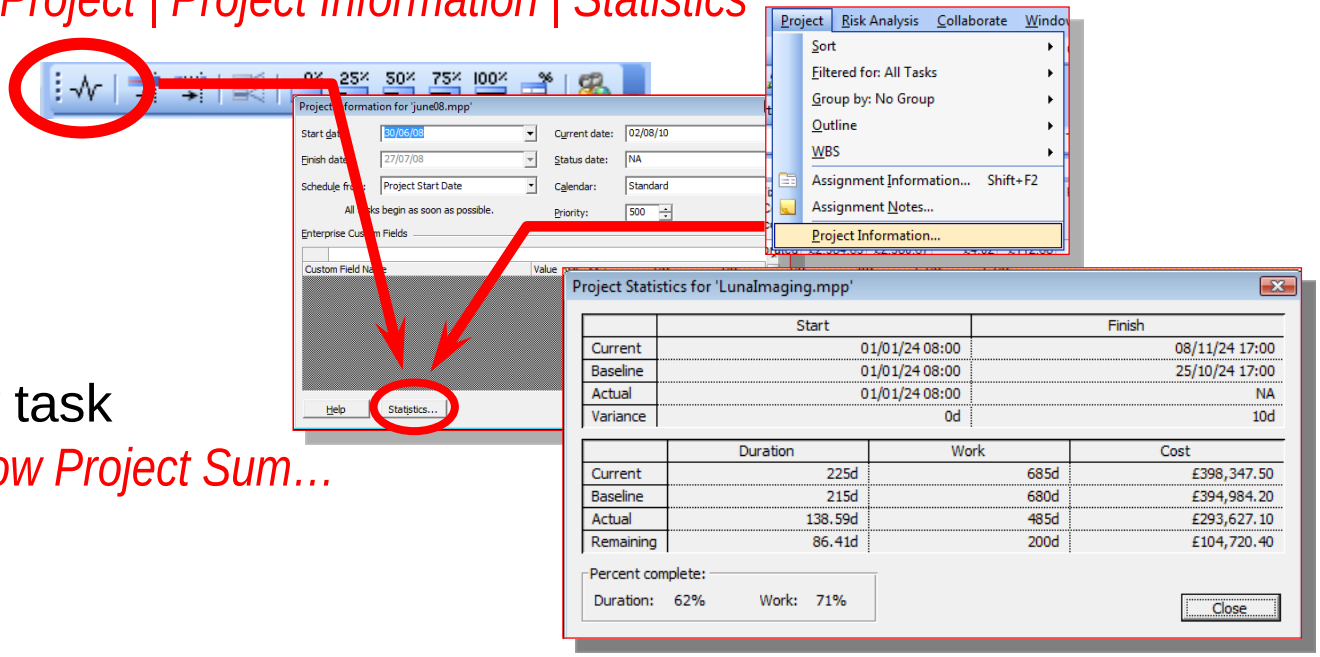
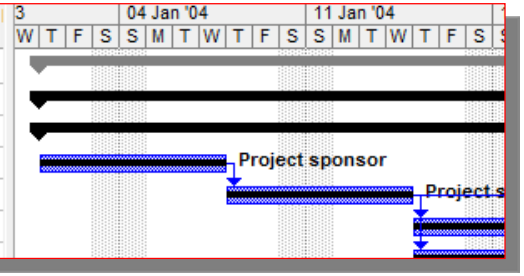
- Project status is shown in *Project | Project Information | Statistics* or *Tracking Toolbar | Statistics*



- Also the Project Summary task
  Tools | Options | View-Tab | Show Project Sum…

Gantt Chart

	Task Name	Cost	Duration	Start	Finish	Work	BCWP
0	Engineering	£1,993,290.00	612.25 days	01 Jan '04	08 May '06	38,256 hrs	£17,000.00
1	Conceptual	£164,440.00	80 days	01 Jan '04	21 Apr '04	3,536 hrs	£17,000.00
2	Planning and Control	£1,190.00	20 days	01 Jan '04	28 Jan '04	600 hrs	£17,000.00
3	Business plan identifyir	£1,190.00	5 days	01 Jan '04	07 Jan '04	40 hrs	£4,000.00
4	Define project objective	£0.00	5 days	08 Jan '04	14 Jan '04	40 hrs	£4,000.00
5	Identify industry standa	£0.00	5 days	15 Jan '04	21 Jan '04	120 hrs	£6,500.00
6	Develop preliminary cor	£0.00	5 days	15 Jan '04	21 Jan '04	120 hrs	£2,500.00



Filters Display Only a Subset

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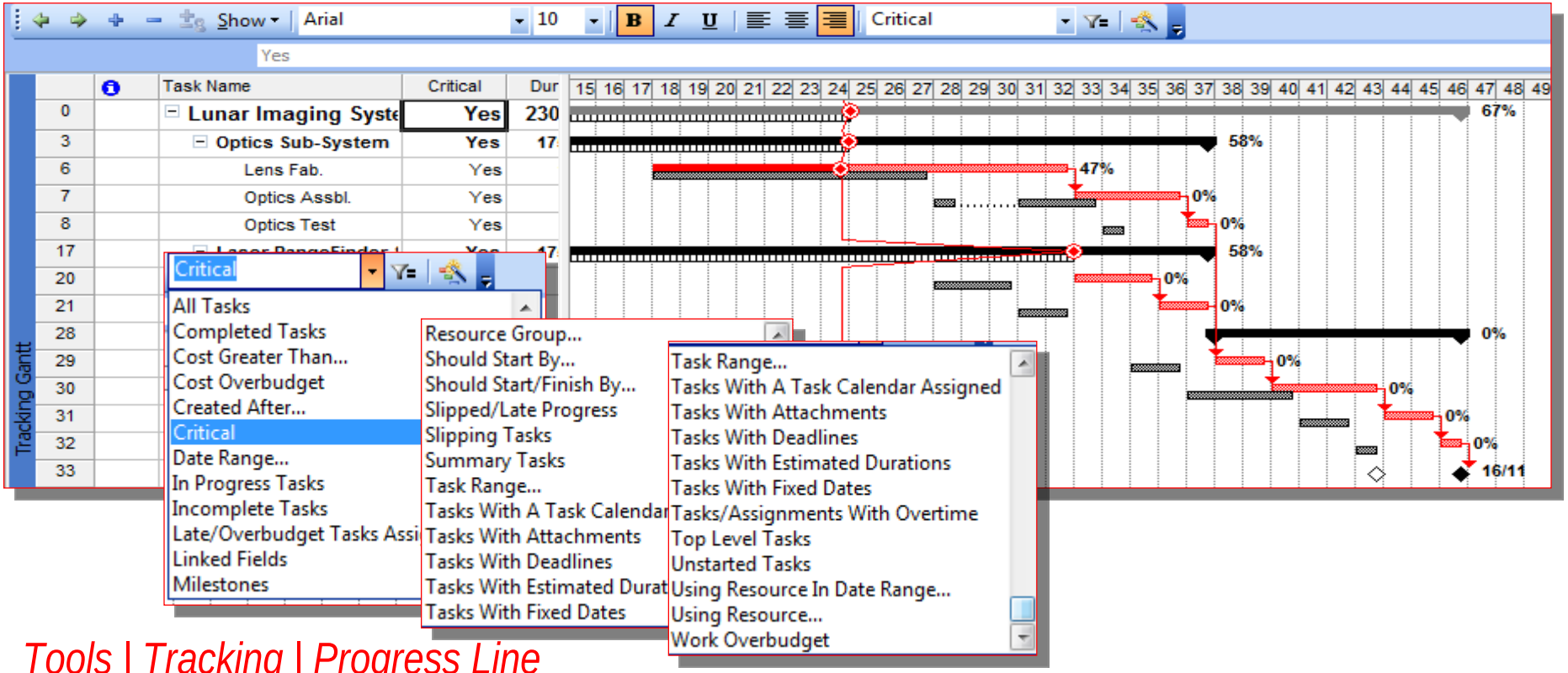
- Primary place to monitor schedule must be the critical path
  - Some filters are useful in planning, some in tracking



- *Tools | Tracking | Progress Line*

Using Filters: Replacing A Resource

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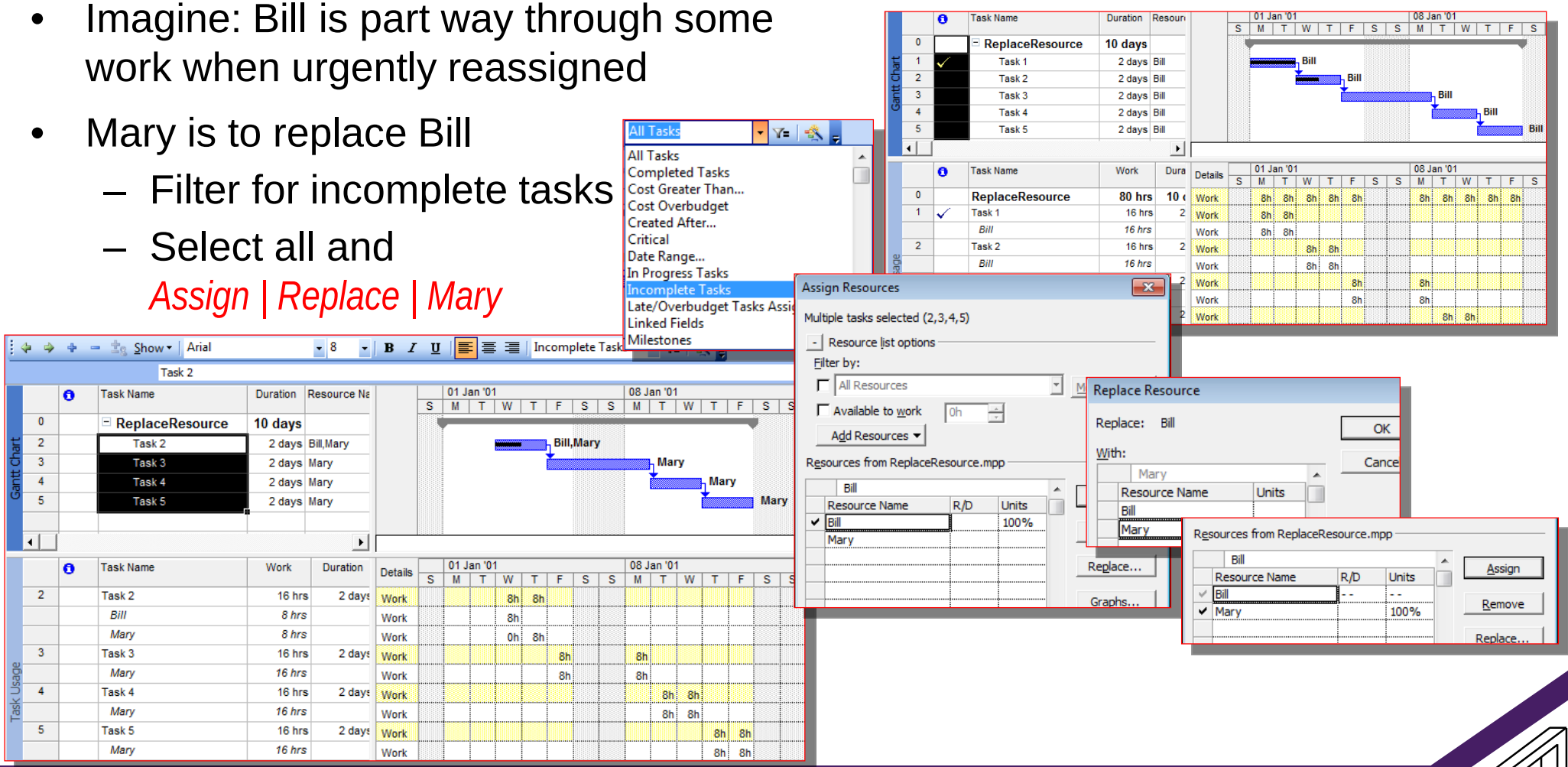
- Imagine: Bill is part way through some work when urgently reassigned
- Mary is to replace Bill
  - Filter for incomplete tasks
  - Select all and *Assign | Replace | Mary*



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This slide in animated in PowerPoint to illustrate the sequence of steps

See Replace Resources.mpp

Contents: Using Earned Value In MSPJ

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- Preparing to Track and Tracking
  - Calculation Options
  - High level tracking
  - Low level tracking
- Tracking Costs
- Status, Filters and amending the plan's contents
- Using Earned Value
- MSPJ capabilities for data reporting, exporting and exchanging

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Using Earned Value

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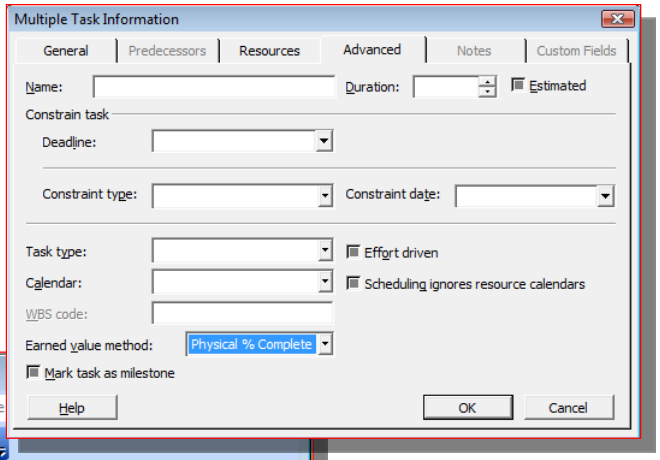
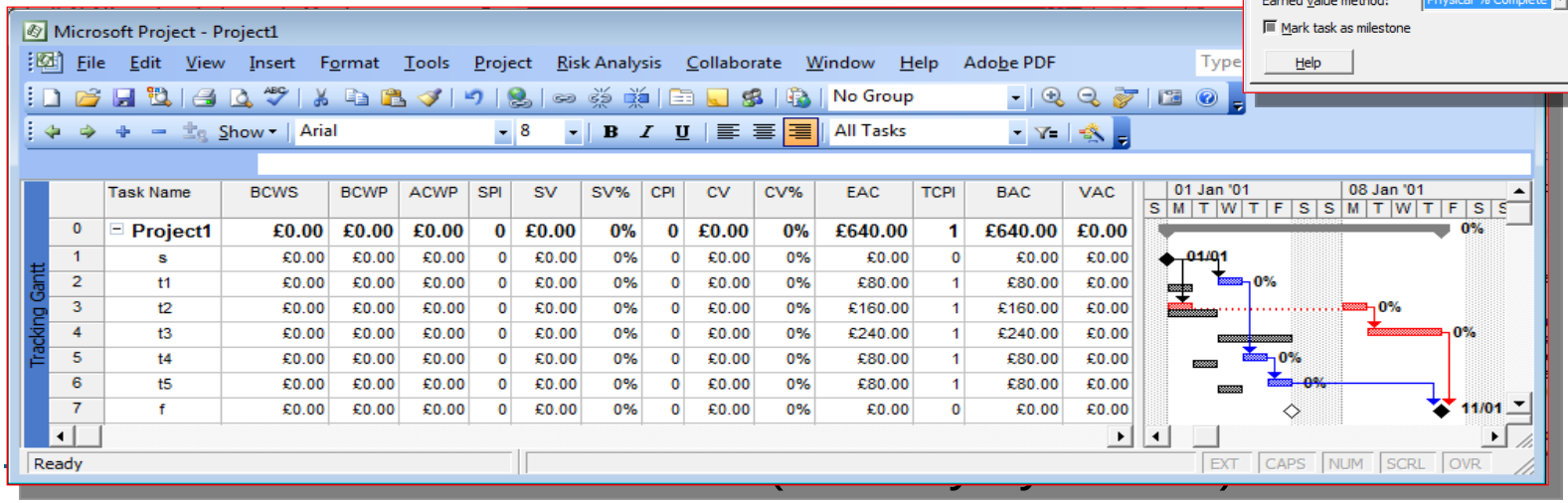
- EV only requires you have a project baseline with resource assignments and track actual progress
  - 'Meaningful' results possible using *Physical % Complete* to determine **BCWP**





  - ACWP calculated from task fixed costs and resource consumption

MSPJ Calculations of BCWP

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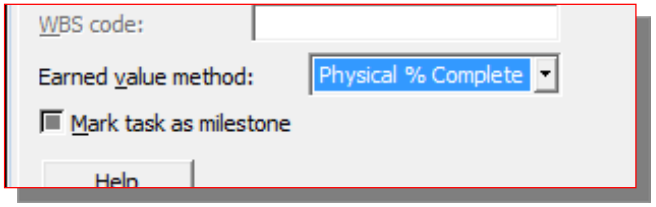
- MSPJ determines BCWP from %Complete and Status date

%C = 75%, BCWP =120 ☺ BCWS = £160
Because Status date = 5th Jan

%C = 0%, BCWP =0 BCWS = £80
Because Status date = 5th Jan ☺

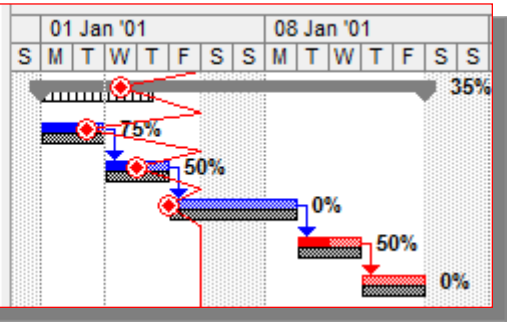
%C = 50%, BCWP =0 ☹
BCWP Because Status date = 5th Jan !



%C = 50%, BCWP =80 ☺ BCWS=0
BCWS from date & BCWP from EV method

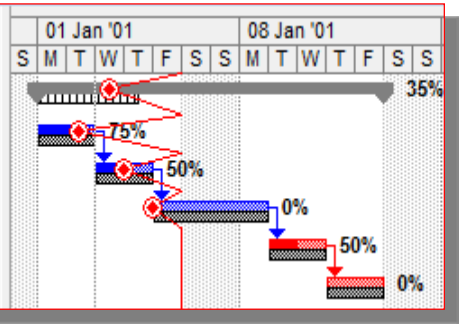
Tracking Gantt

	Baseline Cost	BCWS	BCWP	ACWP
0	£800.00	£400.00	£200.00	£200.00
1	£160.00	£160.00	£120.00	£120.00
2	£160.00	£160.00	£80.00	£80.00
3	£160.00	£80.00	£0.00	£0.00
4	£160.00	£0.00	£0.00	£0.00
5	£160.00	£0.00	£0.00	£0.00



Tracking Gantt

	Physical % Complete	Baseline Cost	BCWS	BCWP	ACWP
0	35%	£800.00	£400.00	£280.00	£200.00
1	75%	£160.00	£160.00	£120.00	£120.00
2	50%	£160.00	£160.00	£80.00	£80.00
3	0%	£160.00	£80.00	£0.00	£0.00
4	50%	£160.00	£0.00	£80.00	£0.00
5	0%	£160.00	£0.00	£0.00	£0.00



- May also be necessary to use manual cost calculations to get correct ACWP

How do we Earn Value?

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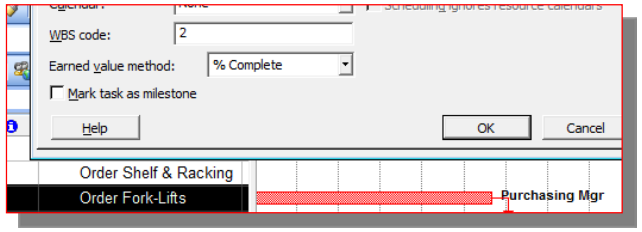
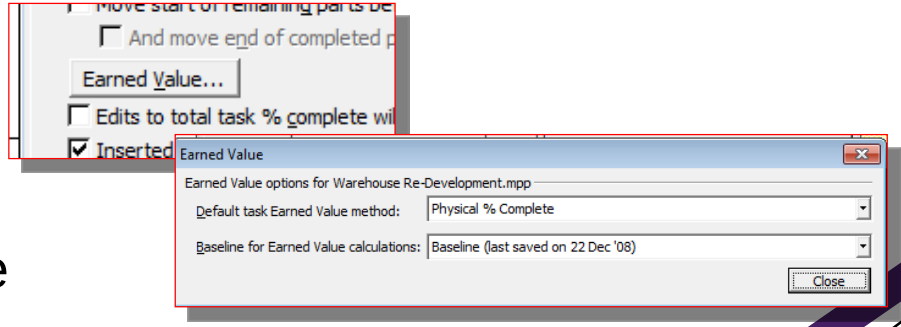
- Physical % Complete also allows use of EV Types
- Plan how we earn value for each activity
  - 0-100, 50-50 (or 25-75, 75-25, etc)
  - Percent complete, Weighted milestones
    - Percent complete with milestones
  - Apportioned effort and Level of effort (LOE)
  - Value is earned using the same method as was planned!
- Global default Tools | Options | Calculation





- Task setting on Task Information dialogue

Earned Value Fields

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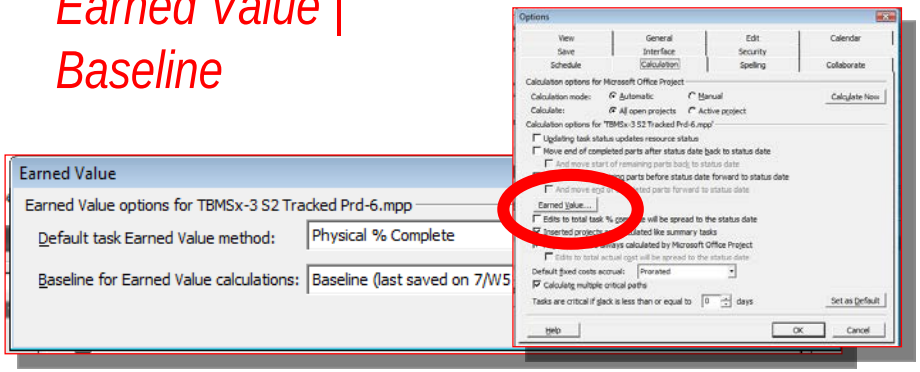
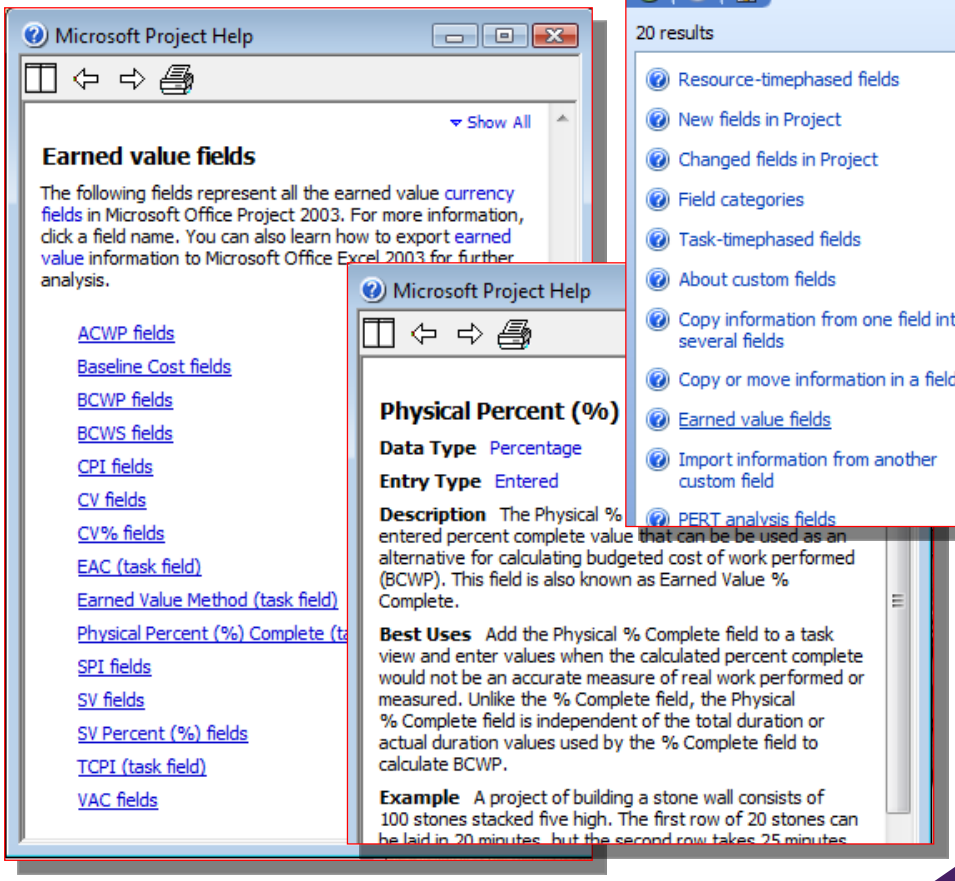
- EV in MSPJ doesn't require any extra work – its free!
  - Set up the costed assignments
  - Save a baseline
  - Track the results
- MSPJ generates EV whenever the above is done !
- EV Calculated against any baseline
  Tools | Options | Calculation | Earned Value | Baseline





Neasden By-Pass

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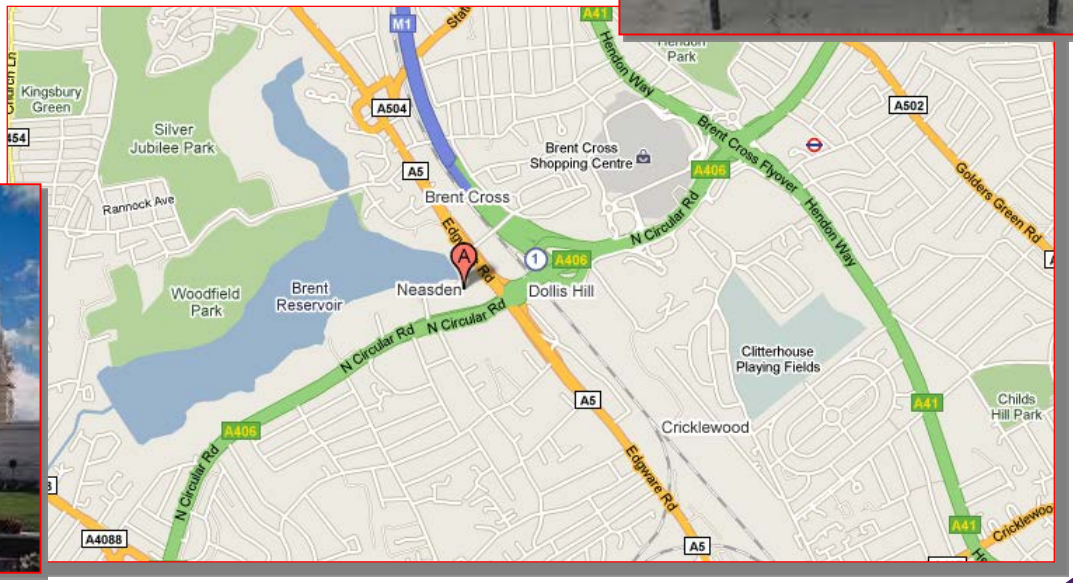
- We are Road Builders Ltd.
- Our latest project will resurface 100 lane-miles of road-way around Neasden
  - We are scheduled to resurface 10miles per month
  - Road costs £1k per mile to resurface
  - There are no setup costs



Neasden By-Pass: Status Summary Months 1 through 5

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We planned to have completed £10k of the budgeted work
We planned to have laid 10 miles of road, irrespective of what it actually cost to do it

We've spent £8k

Project	Plan	Status			
	Budgeted Cost of Work Scheduled (BCWS)	Actual Cost of Work Performed (ACWP)		Budgeted Cost of Work Performed (BCWP)	
	Cumulative	In Period	Cumulative	In Period	Cumulative
Month 1	10 miles 10k	8k	8k	6 miles	6k
Month 2	20 miles 20k	12k	20k	8 miles	14k
Month 3	30k	8k	28k		
Month 4	40k	19k	47k	10 miles	31k
Month		13k			
etc					

We have completed £6k of the planned work
We have actually done 6 miles

6 miles completed of 10 miles
60% of scheduled progress

8k paid 6 miles done
130% of budgeted cost

We planned to have done 10 miles of road, but we've actually laid 6 miles, and its cost us £8k to do it

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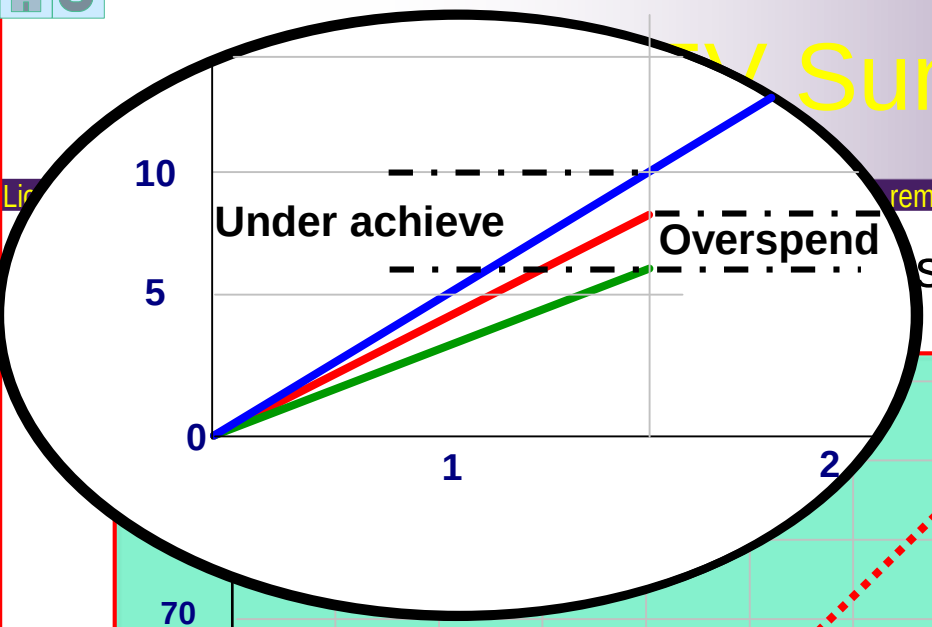
EV Summary Months 1 through 5

removes this note: Please report unlicensed comm

s incurred 8k: ? Current Status?



Cost Variance At Completion (if systematic)

BAC

BCWS or Plan (PMB)

Time Variance At Completion (if systematic)

Spent ! ACWP

Achieved BCWP

Months

70
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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Practice Worksheet: Duplicate the Project Status Reporting

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Project	Plan	Status		Performance Indicators						Forecast			
	BCWS	ACWP	BCWP	CV	CPI	CV%	SV	SPI	SV%	EAC1 (CPI)	CPI* SPI	EAC2 (CS)	TCPI
Mth 1	10k	8k	6k	-2k	0.75	-33%	-4k	0.6	-40%	133.3k	0.45	216.9k	1.02
Mth 2	20k	20k	14k	-6k	0.7	-43%	-6k	0.7	-30%	142.86	0.49	195.51	1.08
Mth 3	30k	28k	21k	-7	0.75	-33%	-9	0.7	-30%	133.33	0.53	178.48	1.10
Mth 4	40k	47k	31k	-16	0.66	-52%	-9	0.78	-23%	151.61	0.51	181.98	1.30
Mth 5	50k	60k	40k	-20	0.67	-50%	-10	0.80	-20%	150.00	0.53	172.5	1.50
Mth 6	60k	72k	51k	-21	0.71	-41%	-9	0.85	-15%	141.18	0.60	153.38	1.75
Mth 7	70k	84k	58k	-26	0.69	-45%	-12	0.83	-17%	144.83	0.57	157.41	2.63
Mth 8	80k	95k	67k	-28	0.71	-42%	-13	0.84	-16%	141.79	0.59	150.87	6.60
Mth 9	90k	106k	78k	-28	0.74	-36%	-12	0.87	-13%	135.9	0.64	140.50	NA
Mth 10	100k	117k	82k	-35	0.70	-43%	-18	0.82	-18%	142.68	0.57	148.32	NA
Mth 11	100k	128k	94k	-34	0.73	-36%	-6	0.94	-6%	136.17	0.69	136.69	NA
Mth 12	100k	140k	100k	-40	0.71	-40%	0	1.00	0	140.00	0.71	140.00	NA
Mth 13	100k	143k	100k	-43	0.70	-43%	0	1.00	0	143.00	0.70	143.00	NA

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BAC (Budget at Completion) = £100k

Neasden By-Pass in MSPJ

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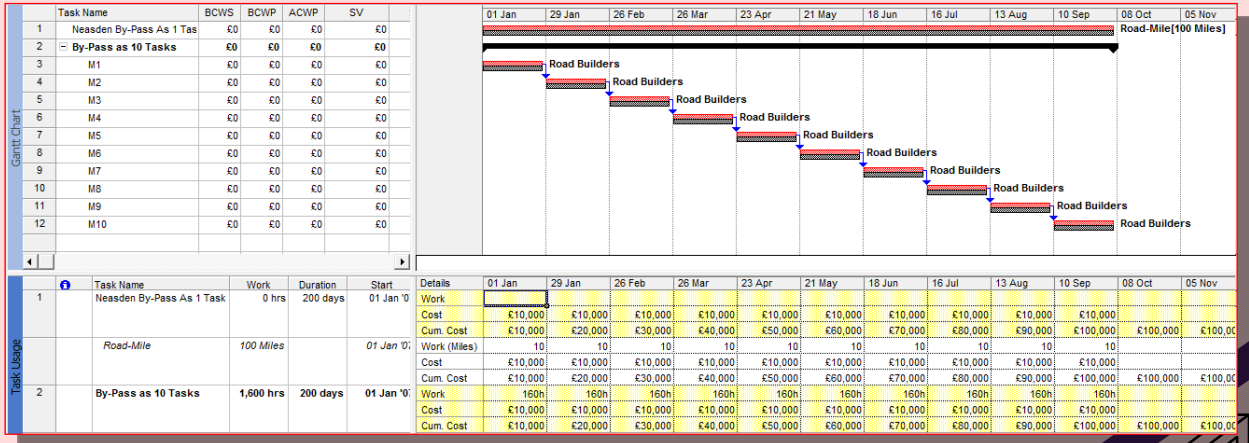
- To track the work in MSPJ requires determining how to set-up the project
- Regular progress expected per month
  - So a month is constant number of days: 4 weeks rather than Jan, Feb, …
  - Each month could be a separate task or the project could be one big task
  - Resource consumed could be 'Miles of Road' or labour units
- Duration is 10mths * 4 Weeks * 5 days = 200 work days
  - 200d at 8 Std. hrs/ day = 1,600 work units
  - £100,000/200d = 500/d
  - £500 at 8 Std. hrs/ day = 62.50 / work unit
  - IE *Actual Cost* of £8,000 = *Actual Work* of 128hrs



Monthly Road Data Needs To Be Entered as Raw Hours

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Project	Tracking Periods		Status		
	Start Date	End Date	Cost	Cost in Hours	Achieved Miles = %
Mth 1	01.01.07	26.01.07	8k	128	6 %
Mth 2	29.01	23.02.07	12k	192	8 %
Mth 3	26.02	23.03	8k	128	7 %
Mth 4	26.03	20.04	19k	304	10 %
Mth 5	23.04	18.05	13k	208	9 %
Mth 6	21.05	15.06	12k	192	11 %
Mth 7	18.06	13.07	12k	192	7 %
Mth 8	16.07	10.08	11k	176	9 %
Mth 9	13.08	07.09	11k	176	11 %
Mth 10	10.09	05.10	11k	176	4 %
Mth 11	08.10	02.11	11k	176	12 %
Mth 12	05.11	30.11	12k	192	6 %
Mth 13	03.12		3k	48	0 %

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BAC (Budget at Completion) = £100k

EV Solution-1: One Task Approach

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- Set project start date
  - For convenience start project on 1st Jan 2007
- Define a 200d task & Set to be Fixed Work
- Define a £500/day resource
  - Assign to task and allow MSPJ to calculate Cost (£100k) and Work (1,600hr)
- Set tracking defaults
  - Set *Update task updates Resources*: OFF
    - Remaining Work and %Complete can be entered in a way that reflects progress without SPI and CPI being equal to 1 !
  - Leave cost calculations set to Auto
  - EV can be based on %Complete,
  - May wish to set Decimal Places=0 (just for narrower columns!)

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EV Solution-1: Project Statistics

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- Save baseline
- Perhaps split screen with Tracking Gantt and EV Table in top half
  - Display *Task Usage* & select fields of interest *Actual Work* and *% Complete*
  - Set timescale conveniently (EG to every 4 weeks)
- Set status date according to progress data & track *Actual Work* and *%Complete*
  - Track progress each month upto but not including month 10
    - Tracked m10 at a weekly level otherwise MSPJ's creates 2 weeks task delay
    - Track months 11 and 12
  - Status date can be set beyond project finish date before tracking any data

EV Solution-1: 1,600hrs Start Point

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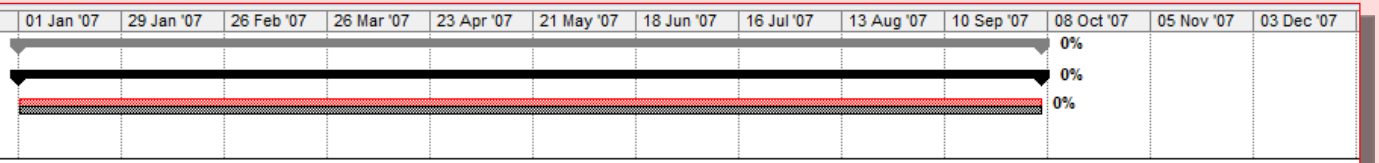
- Track hours spent to determine ACWP, and %Complete for BCWP

Tracking Gantt

	Task Name	BCWS	BCWP
0	Neasden Baseline	£0	£0
1	Resurfacing Summa	£0	£0
2	ReSurface 100LM (	£0	£0



Task Usage

	Task Name	Work	Details	04 Dec '06	01 Jan '07	29 Jan '07	26 Feb '07	26 Mar '07	23 Apr '07	21 May '07	18 Jun '07	16 Jul '07	13 Aug '07	10 Sep '07	08 Oct '07	05 Nov '07	03 Dec '07
2	ReSurface 100LM of Road	1,600 hrs	Act. W														
			Base.		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
			Act. C														
			Base.		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
			ACWP	£0													
			BCWP														
			BCWS														
			CPI														
			CV	£0													
			CV%														
			SPI														
			SV														
			SV%														
			% Allo														
	Road Worker	*1,600 hrs*	Act. W														
			Base.		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
			Act. C														
			Base.		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
			ACWP														
			BCWP														
			BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000	£100,000	£100,000	£100,000
			CPI														
			CV														
			CV%														
			SPI														
			SV		-£10,000	-£20,000	-£30,000	-£40,000	-£50,000	-£60,000	-£70,000	-£80,000	-£90,000	-£100,000	-£100,000	-£100,000	-£100,000
			SV%														
			% Allo		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			

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EV Solution-1: Tracked to Month 5

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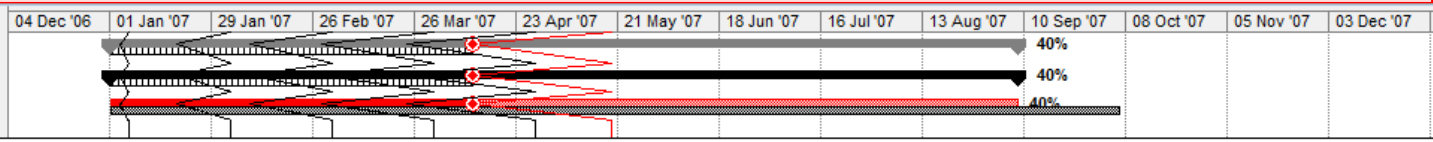
Tracking Gantt

	Task Name	BCWS	BCWP
0	Neasden Baseline	£50,000	£40,0
1	Resurfacing Summa	£50,000	£40,0
2	ReSurface 100LM (	£50,000	£40,0



Task Usage

	Task Name	Work	Details	04 Dec '06	01 Jan '07	29 Jan '07	26 Feb '07	26 Mar '07	23 Apr '07	21 May '07	18 Jun '07	16 Jul '07	13 Aug '07	10 Sep '07	08 Oct '07	05 Nov '07	03 Dec '07
2	ReSurface 100LM of Road	1,600 hrs	Act. Work		128h	192h	128h	304h	208h								
			Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
			Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000								
			Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
			ACWP		£8,000	£20,000	£28,000	£47,000	£60,000								
			BCWP		£6,000	£14,000	£21,000	£31,000	£40,000								
			BCWS		£10,000	£20,000	£30,000	£40,000	£50,000								
			CPI		0.75	0.7	0.75	0.66	0.67								
			CV		-£2,000	-£6,000	-£7,000	-£16,000	-£20,000								
			CV%		-33%	-42%	-33%	-51%	-50%								
			SPI		0.6	0.7	0.7	0.78	0.8								
			SV		-£4,000	-£6,000	-£9,000	-£9,000	-£10,000								
			SV%		-40%	-30%	-30%	-22%	-20%								
			% Complete		6%	8%	7%	10%	9%								
	Road Worker	*1,600 hrs*	Act. Work		128h	192h	128h	304h	208h								
			Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
			Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000								
			Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
			ACWP		£8,000	£20,000	£28,000	£47,000	£60,000								
			BCWP		£8,000	£20,000	£28,000	£47,000	£60,000								
			BCWS		£10,000	£20,000	£30,000	£40,000	£50,000								
			CPI														
			CV		£0	£0	£0	£0	£0								
			CV%														
			SPI														
			SV		-£2,000	£0	-£2,000	£7,000	£10,000								
			SV%														
			% Complete														

EV Solution-1: Tracked to Month 10

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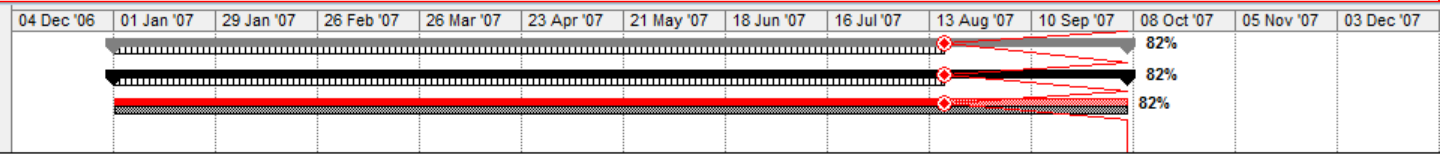
- We should have finished but have not

Tracking Gantt

	Task Name	BCWS	BCWP
0	Neasden tracked to	£100,000	£82,0
1	Resurfacing Summa	£100,000	£82,0
2	ReSurface 100LM c	£100,000	£82,0



Task Usage

	Task Name	Work
2	ReSurface 100LM of Road	1,872 hrs
	Road Worker	*1,872 hrs*

Details	04 Dec '06	01 Jan '07	29 Jan '07	26 Feb '07	26 Mar '07	23 Apr '07	21 May '07	18 Jun '07	16 Jul '07	13 Aug '07	10 Sep '07	08 Oct '07	05 Nov '07	03 Dec '07
Act. Work		128h	192h	128h	304h	208h	192h	192h	176h	176h	176h			
Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000	£12,000	£12,000	£11,000	£11,000	£11,000			
Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
ACWP		£8,000	£20,000	£28,000	£47,000	£60,000	£72,000	£84,000	£95,000	£106,000	£117,000			
BCWP		£6,000	£14,000	£21,000	£31,000	£40,000	£51,000	£58,000	£67,000	£78,000	£82,000			
BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000			
CPI		0.75	0.7	0.75	0.66	0.67	0.71	0.69	0.71	0.74	0.7			
CV		-£2,000	-£6,000	-£7,000	-£16,000	-£20,000	-£21,000	-£26,000	-£28,000	-£28,000	-£35,000			
CV%		-33%	-42%	-33%	-51%	-50%	-41%	-44%	-41%	-35%	-42%			
SPI		0.6	0.7	0.7	0.78	0.8	0.85	0.83	0.84	0.87	0.82			
SV		-£4,000	-£6,000	-£9,000	-£9,000	-£10,000	-£9,000	-£12,000	-£13,000	-£12,000	-£18,000			
SV%		-40%	-30%	-30%	-22%	-20%	-15%	-17%	-16%	-13%	-18%			
% Complete		6%	8%	7%	10%	9%	11%	7%	9%	11%	4%			
Act. Work		128h	192h	128h	304h	208h	192h	192h	176h	176h	176h			
Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h			
Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000	£12,000	£12,000	£11,000	£11,000	£11,000			
Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000			
ACWP		£8,000	£20,000	£28,000	£47,000	£60,000	£72,000	£84,000	£95,000	£106,000	£117,000			
BCWP		£6,838	£17,094	£23,932	£40,171	£51,282	£61,539	£71,795	£81,197	£90,598	£100,000			
BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000			
CPI														
CV		-£1,162	-£2,906	-£4,068	-£6,829	-£8,718	-£10,462	-£12,205	-£13,803	-£15,402	-£17,000			
CV%														
SPI														
SV		-£3,162	-£2,906	-£6,068	£171	£1,282	£1,539	£1,795	£1,197	£598	£0			
SV%														
% Complete														

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EV Solution-1: Tracked to Completion

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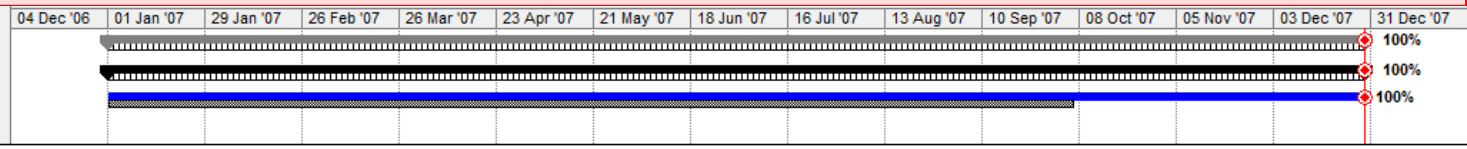
- Project now completed

Tracking Gantt

	Task Name	BCWS	BCWP
0	Neasden tracked to	£100,000	£100,0
1	Resurfacing Summa	£100,000	£100,0
2	ReSurface 100LM (	£100,000	£100,0



Task Usage

		Task Name	Work	Details	04 Dec '06	01 Jan '07	29 Jan '07	26 Feb '07	26 Mar '07	23 Apr '07	21 May '07	18 Jun '07	16 Jul '07	13 Aug '07	10 Sep '07	08 Oct '07	05 Nov '07	03 Dec '07	31 Dec '07
2	✓	ReSurface 100LM of Road	2,288 hrs	Act. Work		128h	192h	128h	304h	208h	192h	192h	176h	176h	176h	176h	192h	48h	
				Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h				
				Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000	£12,000	£12,000	£11,000	£11,000	£11,000	£11,000	£12,000	£3,000	
				Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000				
				ACWP		£8,000	£20,000	£28,000	£47,000	£60,000	£72,000	£84,000	£95,000	£106,000	£117,000	£128,000	£140,000	£143,000	
				BCWP		£6,000	£14,000	£21,000	£31,000	£40,000	£51,000	£58,000	£67,000	£78,000	£82,000	£94,000	£100,000	£100,000	
				BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000	£100,000	£100,000	£100,000	
				CPI		0.75	0.7	0.75	0.66	0.67	0.71	0.69	0.71	0.74	0.7	0.73	0.71	0.7	
				CV		-£2,000	-£6,000	-£7,000	-£16,000	-£20,000	-£21,000	-£26,000	-£28,000	-£28,000	-£35,000	-£34,000	-£40,000	-£43,000	
				CV%		-33%	-42%	-33%	-51%	-50%	-41%	-44%	-41%	-35%	-42%	-36%	-40%	-43%	
				SPI		0.6	0.7	0.7	0.78	0.8	0.85	0.83	0.84	0.87	0.82	0.94	1	1	
				SV		-£4,000	-£6,000	-£9,000	-£9,000	-£10,000	-£9,000	-£12,000	-£13,000	-£12,000	-£18,000	-£6,000	£0	£0	
				SV%		-40%	-30%	-30%	-22%	-20%	-15%	-17%	-16%	-13%	-18%	-6%	0%	0%	
				% Complete		6%	8%	7%	10%	9%	11%	7%	9%	11%	4%	12%	6%	0%	
		Road Worker	*2,288 hrs*	Act. Work		128h	192h	128h	304h	208h	192h	192h	176h	176h	176h	176h	192h	48h	
				Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h				
				Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000	£12,000	£12,000	£11,000	£11,000	£11,000	£11,000	£12,000	£3,000	
				Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000				
				ACWP		£8,000	£20,000	£28,000	£47,000	£60,000	£72,000	£84,000	£95,000	£106,000	£117,000	£128,000	£140,000	£143,000	
				BCWP		£5,594	£13,986	£19,580	£32,867	£41,958	£50,350	£58,741	£66,434	£74,126	£81,818	£89,511	£97,902	£100,000	
				BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000	£100,000	£100,000	£100,000	
				CPI															
				CV		-£2,406	-£6,014	-£8,420	-£14,133	-£18,042	-£21,650	-£25,259	-£28,566	-£31,874	-£35,182	-£38,490	-£42,098	-£43,000	
				CV%															
				SPI															
				SV		-£4,406	-£6,014	-£10,420	-£7,133	-£8,042	-£9,650	-£11,259	-£13,566	-£15,874	-£18,182	-£10,490	-£2,098	£0	
				SV%															
				% Complete															

EV Solution-2: Ten Tasks Reality of Progress Reports

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- If the project is set-up as 10 tasks of 10 miles each then progress reports…:
  - *Month-1* Done 6 miles of section 1 at cost of £8,000 for 20 days
    - IE Achieved 6 miles (96 units of result) at a 'cost' of 8 miles (128 units labour)
  - *M2* Finished section 1 and done 4 miles of S2
    - Both of which cost of 96 units labour each so Secion-1's costs are
    - 6 miles at 16 units / mile and 4 miles at 24 units / mile
  - *M3* Finished S2's overdue 6m and laid 1m of S3 for cost of 128 labour
  - *M4* Laid 9m of s3 and 1m of S4 for a cost of 304 units of labour

- IE Cost per 10 miles is made-up of monthly costs at different efficiencies
  - The EV table given does not reflects our raw data needs (or how it would arrive in reality)

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EV Solution-2: Task per 10 miles

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- 10 tasks each to resurface a Section of 10miles of road in 20days
  - Set project start and status date, Project view, Timescale, Decimal places and Update %Complete doesn't update resources
  - Baseline the plan

- Track Month-1 miles and costs to section 1
- Track month 2 miles and costs to finish Section-1 late and start Section-2

  …

  Track month 8 miles and costs to finish Section-6 (2m) and apply 7m to Section-7

  …

  Track month 12 miles to complete Section-10

Monthly Data Needs To Be Entered as Raw Hours

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Project	Tracking Periods		Status			
	Start Date	End Date	Cost	Cost in Hours	Achieved	Previous Month's Miles Done
Mth 1	01.01.07	26.01.07	8k	128	6 %	0
Mth 2	29.01	23.02.07	12k	192	8 %	M1 = 4 (M2 = 4)
Mth 3	26.02	23.03	8k	128	7 %	M2 = 6 (M3 = 1)
Mth 4	26.03	20.04	19k	304	10 %	M3 = 9 (M4 = 1)
Mth 5	23.04	18.05	13k	208	9 %	M4 = 9 (M5 = 0)
Mth 6	21.05	15.06	12k	192	11 %	M5 = 10 (M6 = 1)
Mth 7	18.06	13.07	12k	192	7 %	M6 = 7 (M7 = 0)
Mth 8	16.07	10.08	11k	176	9 %	M6 = 2 & M7 = 7 (M8 = 0)
Mth 9	13.08	07.09	11k	176	11 %	M7 = 3 & M8 = 8 (M9 = 0)
Mth 10	10.09	05.10	11k	176	4 %	M8 = 2 & M9 = 2 (M10 = 0)
Mth 11	08.10	02.11	11k	176	12 %	M9 = 8 & M10 = 4
Mth 12	05.11	30.11	12k	192	6 %	M10 = 6
Mth 13	03.12		3k	48	0 %	

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BAC (Budget at Completion) = £100k

EV Solution-2: Railways Analysis

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- Each month's miles cost some amount
  - Each months miles (except the first) partially applied to previous months

Railways	Cum BCWS	ACWP £Ks	Cum ACWP	ACWP in Labour	This Mth Units / Mile	Miles Built this month	Applied to This month	Cost This Month Miles	Miles 1 mth Late	Cost 1mth late Miles	Miles 2Mth Late	Cost 2 Mth Late Miles	Cost in Hrs of 10miles
m1	10	8	8	128	21.33333	6	6	128	4	96		0	224
m2	20	12	20	192	24	8	4	96	6	109.7143		0	205.7143
m3	30	8	28	128	18.28571	7	1	18.28571	9	273.6		0	291.8857
m4	40	19	47	304	30.4	10	1	30.4	9	208		0	238.4
m5	50	13	60	208	23.11111	9	0	0	10	174.5455		0	174.5455
m6	60	12	72	192	17.45455	11	1	17.45455	7	192	2	39.11111	248.5657
m7	70	12	84	192	27.42857	7	0	0	7	136.8889	3	48	184.8889
m8	80	11	95	176	19.55556	9	0	0	8	128	2	88	216
m9	90	11	106	176	16	11	0	0	2	88	8	117.3333	205.3333
m10	100	11	117	176	44	4	0	48	4	58.66667	6	192	298.6667
m11		11	128	176	14.66667	12							
m12		12	140	192	32	6							
m13		3	143	48	Added as overhead to all M10							2288	2288

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EV Solution-2: Neasden Tracking Status

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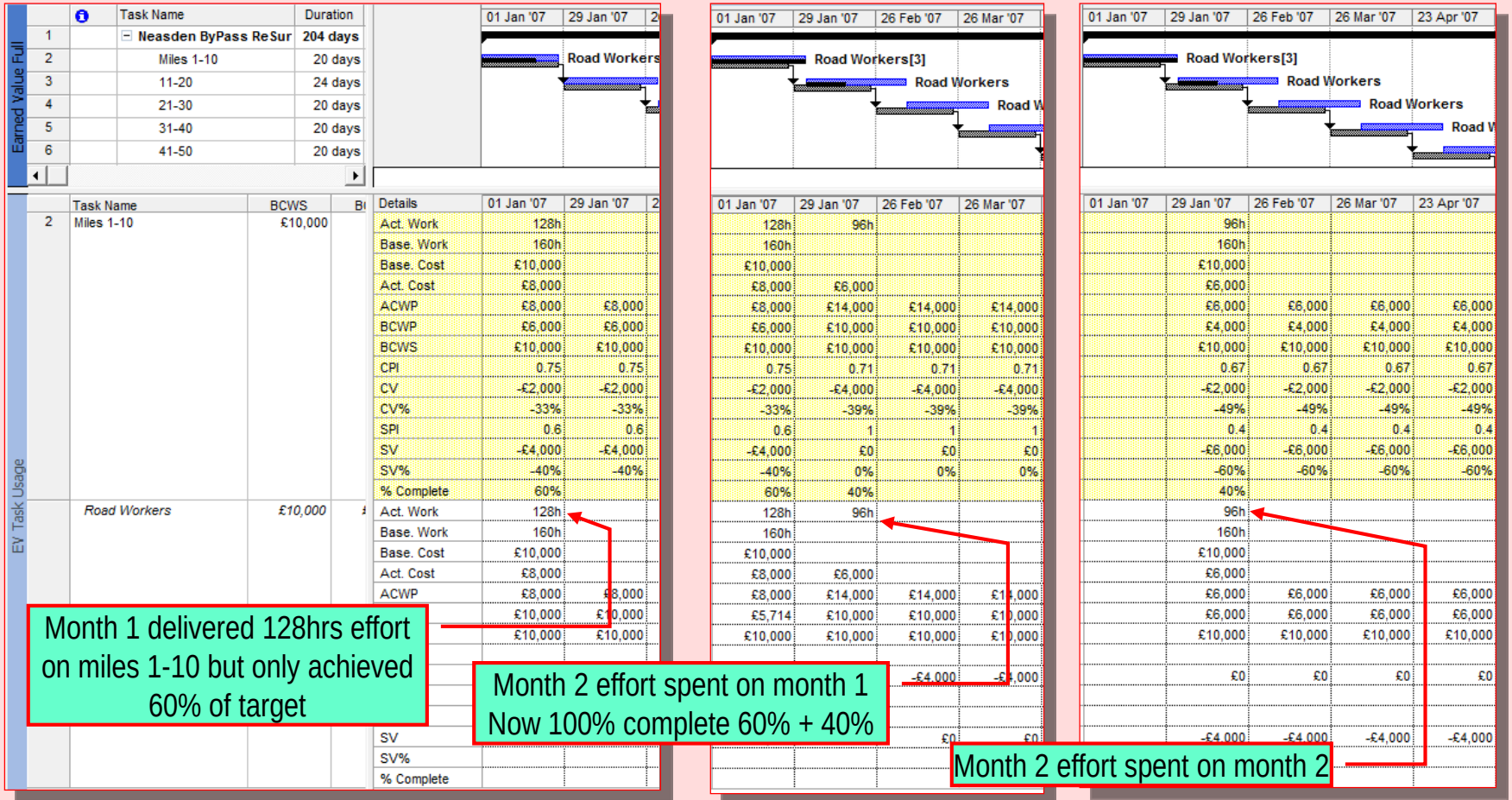
- 128hrs month 1 effort cost £8k, 96hrs (£6k) of month 2 effort used on miles 1-10



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EV Solution-2: Neasden Month 3

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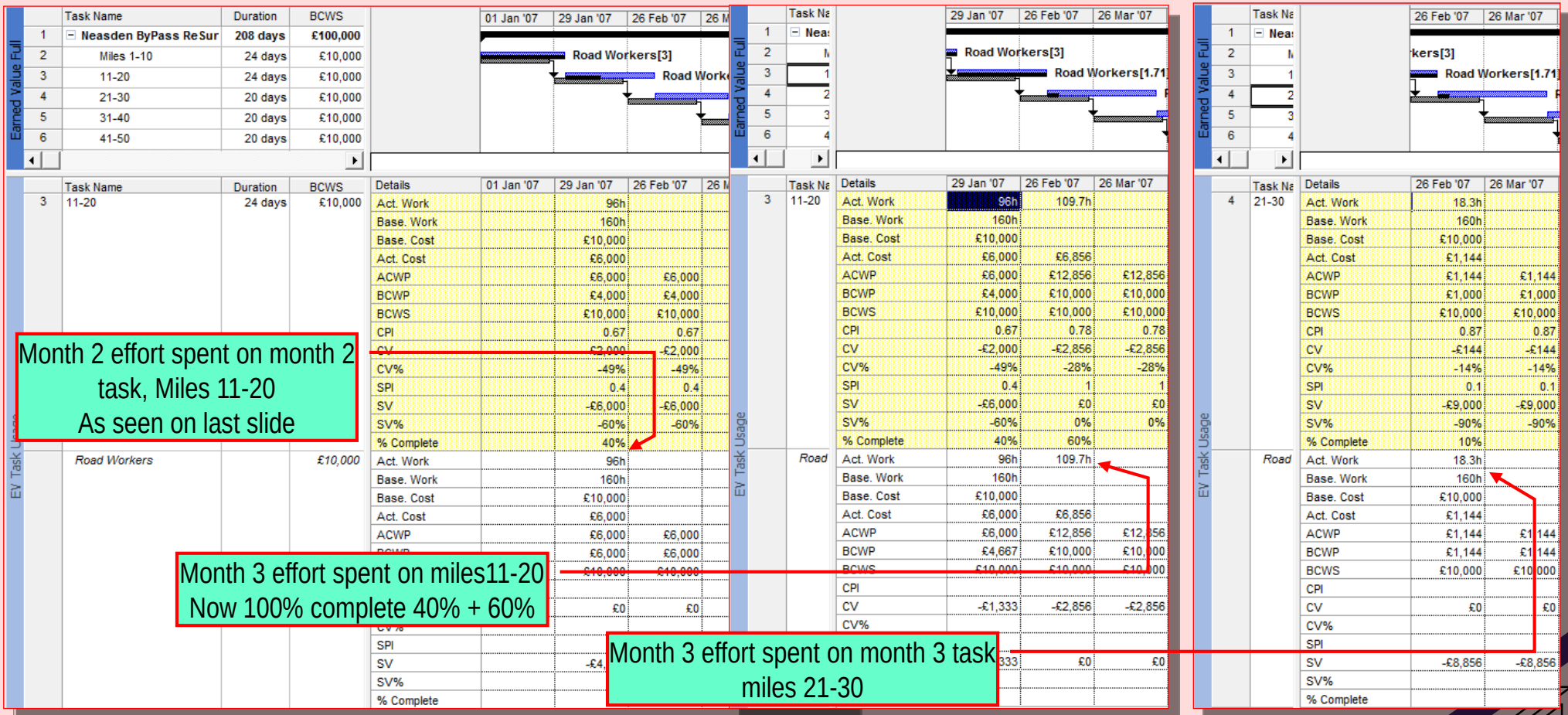
- 109.7hrs of month 3's 128hrs effort spent on miles 11-20 at cost of £6,856



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EV Solution-2: Neasden By-Pass Status Month 6

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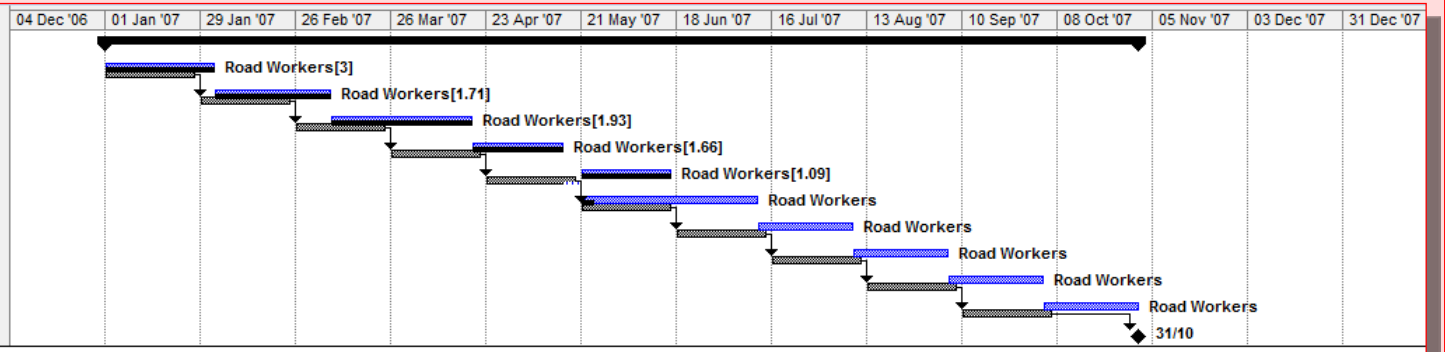
- Project summary task figures show aggregate status (here at end of month 6)

Earned Value Full

	Task Name	BCV
1	Neasden ByPass ReSur	£1(
2	Miles 1-10	£'
3	11-20	£'
4	21-30	£'
5	31-40	£'
6	41-50	£'
7	51-60	£'
8	61-70	£'
9	71-80	£'
10	81-90	£'
11	91-100	£'
12	Finish	



EV Task Usage

	Task Name	BCV	Details	04 Dec '06	01 Jan '07	29 Jan '07	26 Feb '07	26 Mar '07	23 Apr '07	21 May '07	18 Jun '07	16 Jul '07	13 Aug '07	10 Sep '07	08 Oct '07	05 Nov '07	03 Dec '07	31 Dec '07
1	Neasden ByPass ReSurfac	£1(	Act. Work		128h	192h	128h	304h	208h	191.95h								
			Base. Work		160h	160h	160h	160h	160h	160h	160h	160h	160h	160h				
			Base. Cost		£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000	£10,000				
			Act. Cost		£8,000	£12,000	£8,000	£19,000	£13,000	£11,997								
			ACWP		£8,000	£20,000	£28,000	£47,000	£60,000	£71,997	£71,997	£71,997	£71,997	£71,997	£71,997	£71,997	£71,997	£71,997
			BCWP		£6,000	£14,000	£21,000	£31,000	£40,000	£51,000	£51,000	£51,000	£51,000	£51,000	£51,000	£51,000	£51,000	£51,000
			BCWS		£10,000	£20,000	£30,000	£40,000	£50,000	£60,000	£70,000	£80,000	£90,000	£100,000	£100,000	£100,000	£100,000	£100,000
			CPI		0.75	0.7	0.75	0.66	0.67	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
			CV		-£2,000	-£6,000	-£7,000	-£16,000	-£20,000	-£20,997	-£20,997	-£20,997	-£20,997	-£20,997	-£20,997	-£20,997	-£20,997	-£20,997
			CV%		-33%	-42%	-33%	-51%	-49%	-41%	-41%	-41%	-41%	-41%	-41%	-41%	-41%	-41%
			SPI		0.6	0.7	0.7	0.78	0.8	0.85	0.73	0.64	0.57	0.51	0.51	0.51	0.51	0.51
			SV		-£4,000	-£6,000	-£9,000	-£9,000	-£10,000	-£9,000	-£19,000	-£29,000	-£39,000	-£49,000	-£49,000	-£49,000	-£49,000	-£49,000
			SV%		-40%	-30%	-29%	-22%	-20%	-14%	-27%	-36%	-43%	-49%	-49%	-49%	-49%	-49%
			% Complete		6%	8%	7%	12%	7%	10%								

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People's EV Performance

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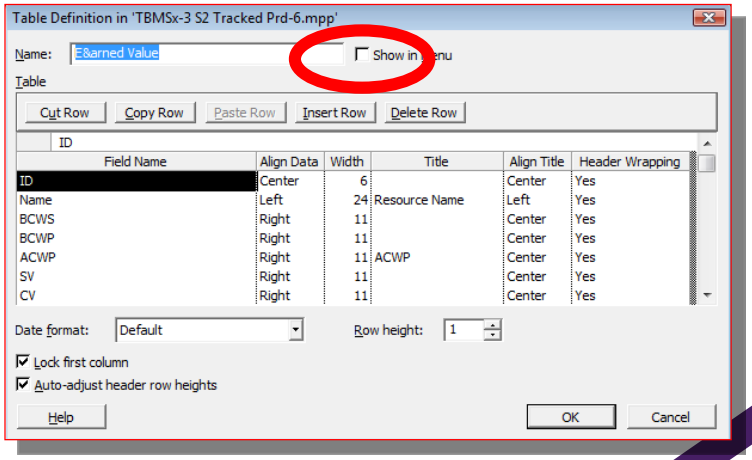
- MSPJ provides EV by resource!
  - *View Resource Sheet | View Table | More Tables | Earned value*
  - Scary prospect!!

	Resource Name	BCWS	BCWP	ACWP	SV	CV	EAC	BAC	VAC
1	Optical Eng.	£94,172	£94,172	£104,262	£0	-£10,090	£104,262	£94,172	-£10,090
2	Drawing Office	£40,810	£38,259	£43,360	-£2,551	-£5,101	£45,911	£40,810	-£5,441
3	SubCon	£9,000	£6,000	£15,000	-£3,000	-£9,000	£65,000	£39,000	-£58,500
4	Instrument Tech	£28,057	£30,607	£33,901	£2,551	-£3,294	£157,741	£140,283	-£15,098
5	Electrical Eng.	£40,360	£40,360	£40,360	£0	£0	£40,360	£40,360	£0
6	Fabr'tn Dept	£40,360	£20,180	£53,813	-£20,180	-£33,633	£63,903	£40,360	-£67,266

- EV isn't in the view menu by default but easy to include
  - *View Table | More Tables | Earned Value | Edit*
  - Default EV Table isn't the set of columns I'd choose but easy to create a new table and save to Global.mpt



Contents: Reporting

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- Preparing to Track and Tracking
  - Calculation Options
  - High level tracking
  - Low level tracking
- Tracking Costs
- Status, Filters and amending the plan's contents
- Using Earned Value
- MSPJ capabilities for data reporting, exporting and exchanging

MSPJ Has Many Reports

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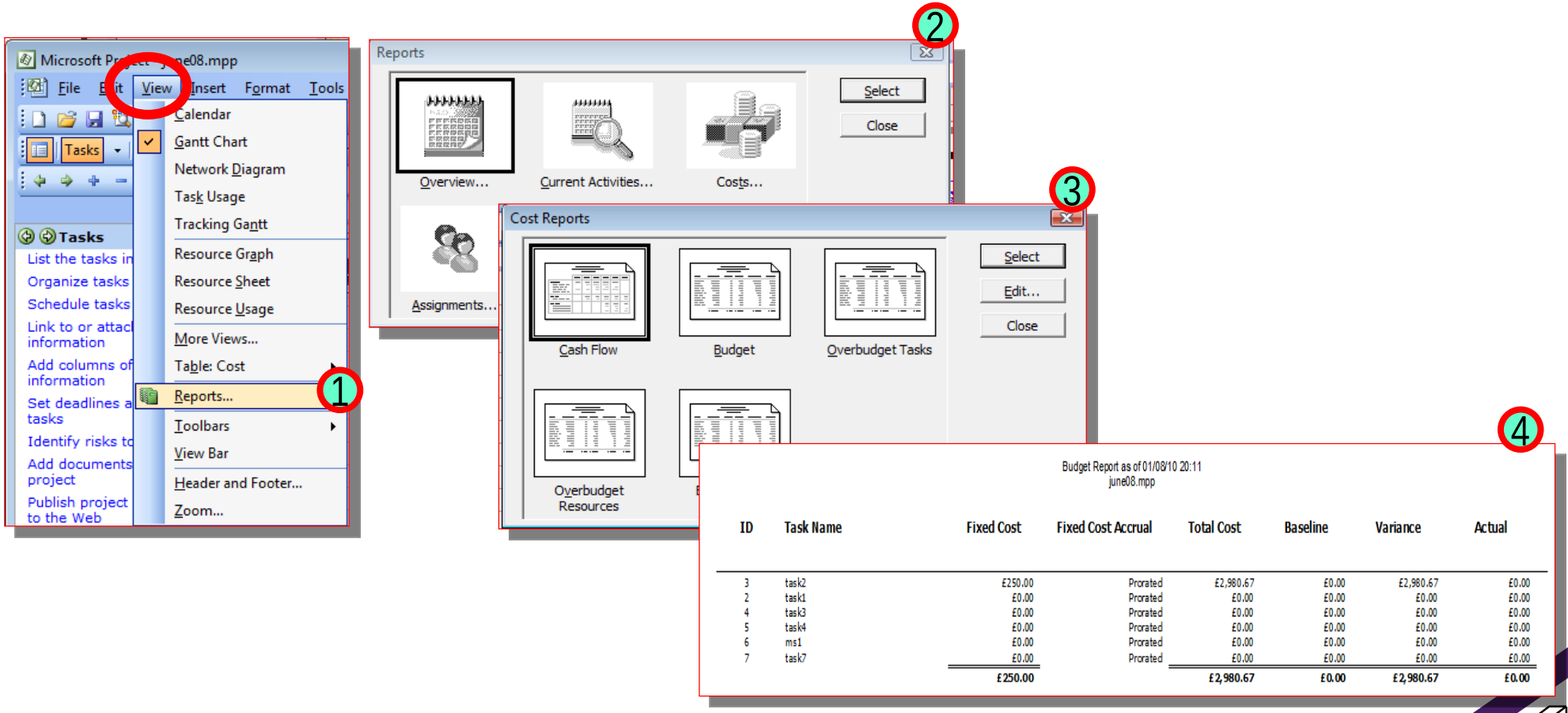
- MSPJ has many reports



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The Reporting Tool's Choices !

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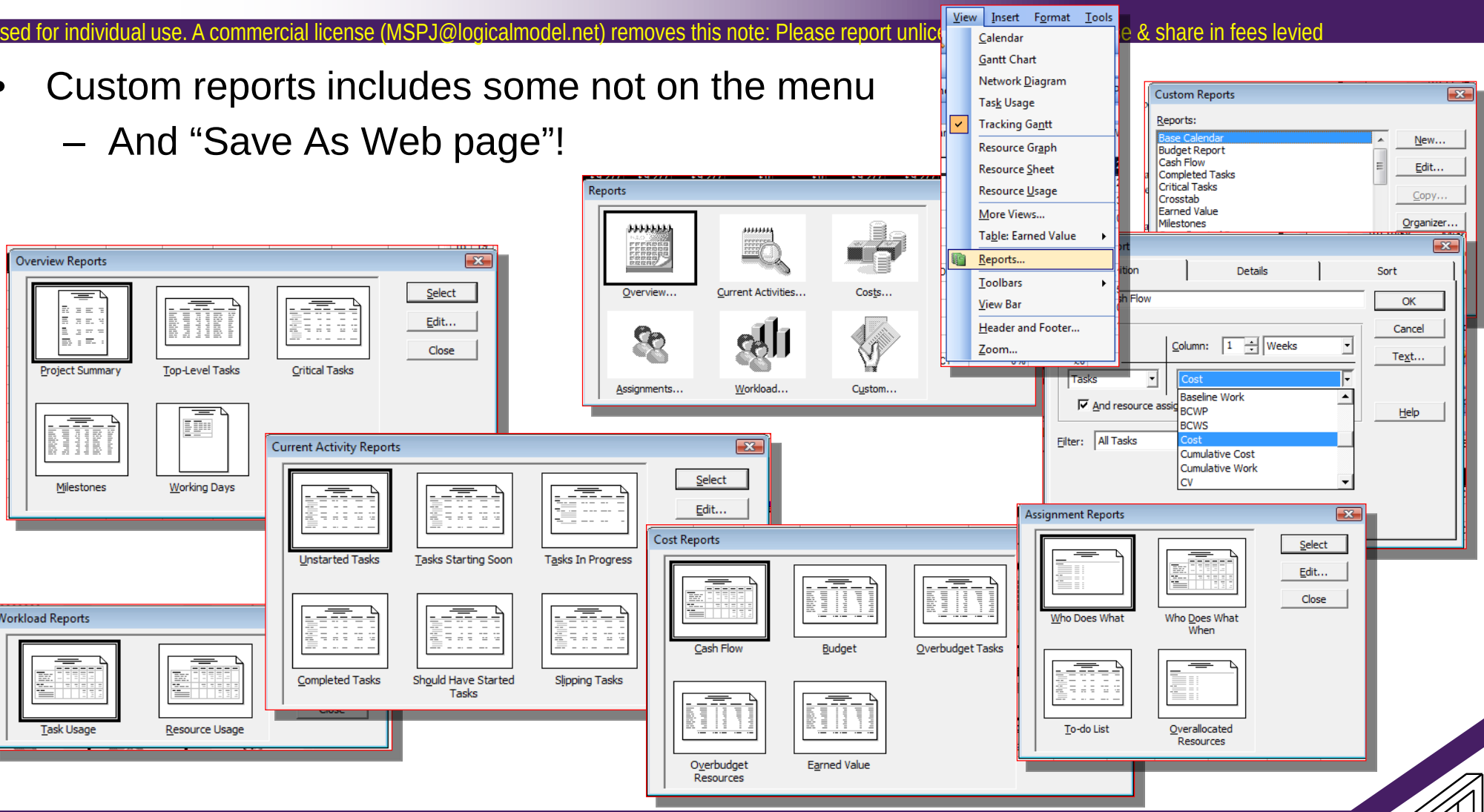
- Custom reports includes some not on the menu
  - And "Save As Web page"!



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Reporting Through Views

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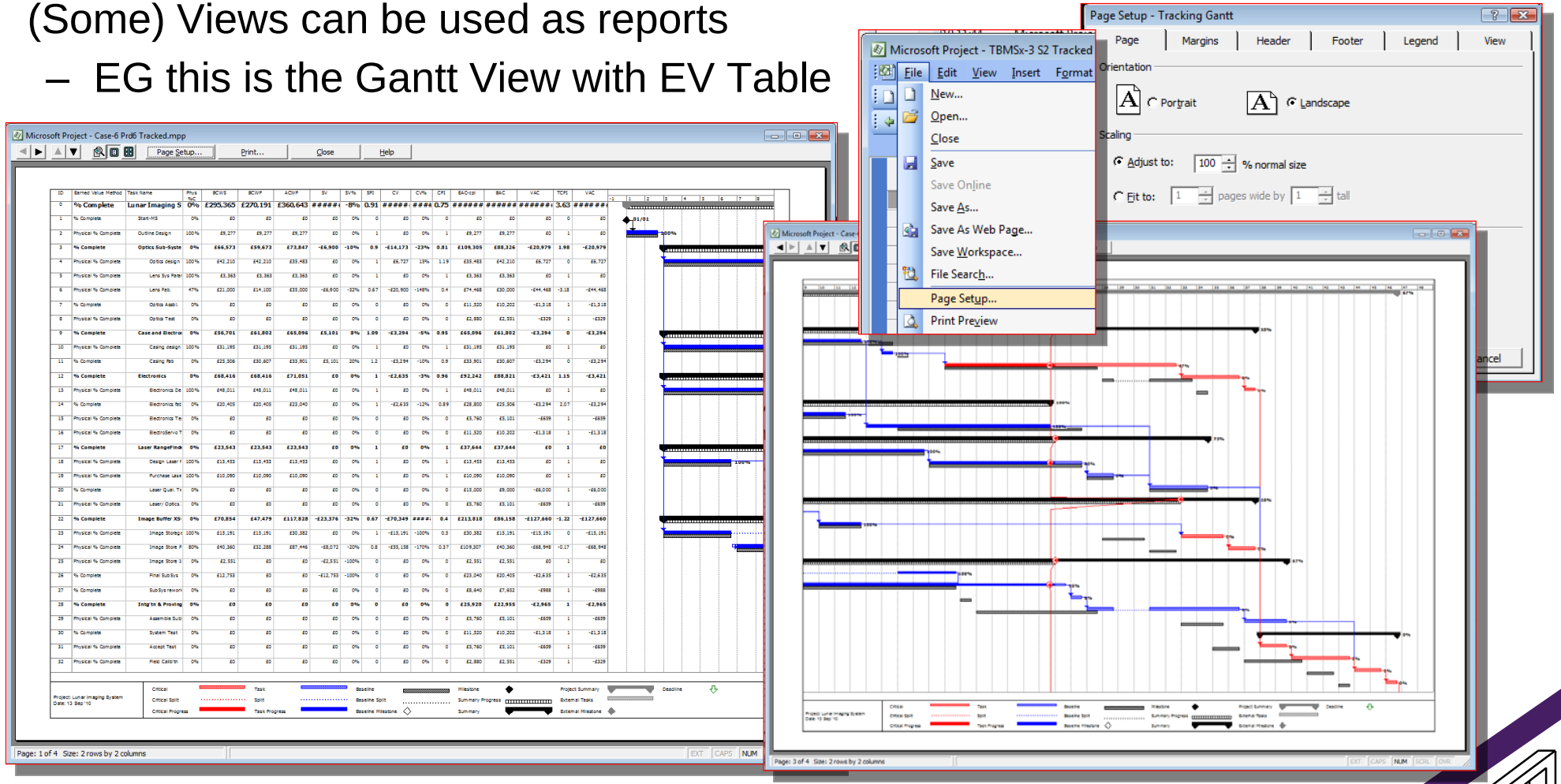
- (Some) Views can be used as reports
  - EG this is the Gantt View with EV Table



Exporting (and Importing) Data

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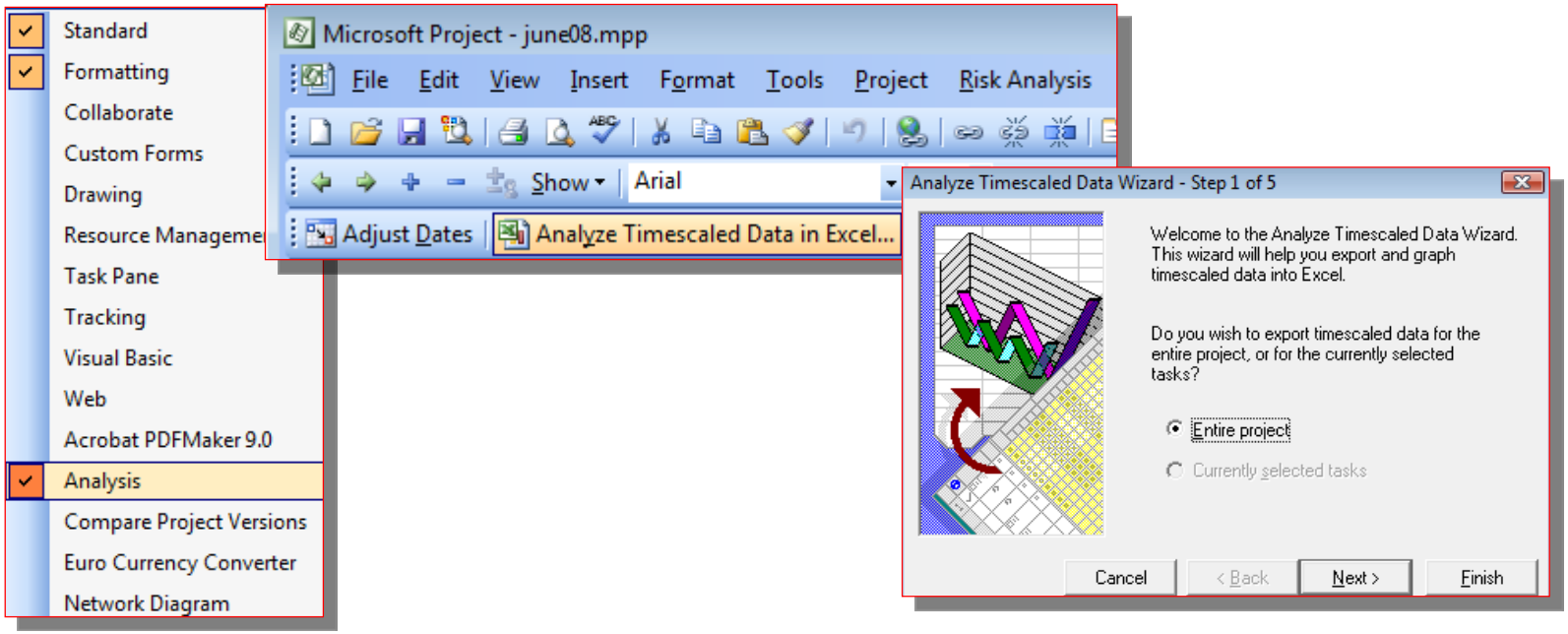
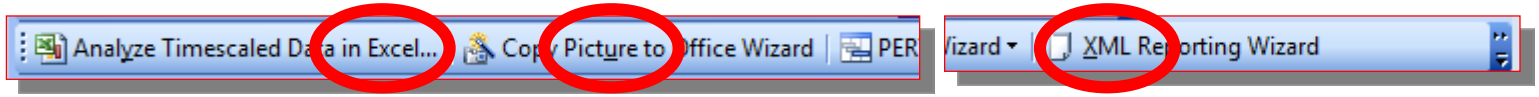
- Wide range of options to pass data to other file format
  - Data can be exchanged dynamically too!





- Also export in XML, save a web-page and more

Dynamic Data Exchange: Linking Excel And MSPJ

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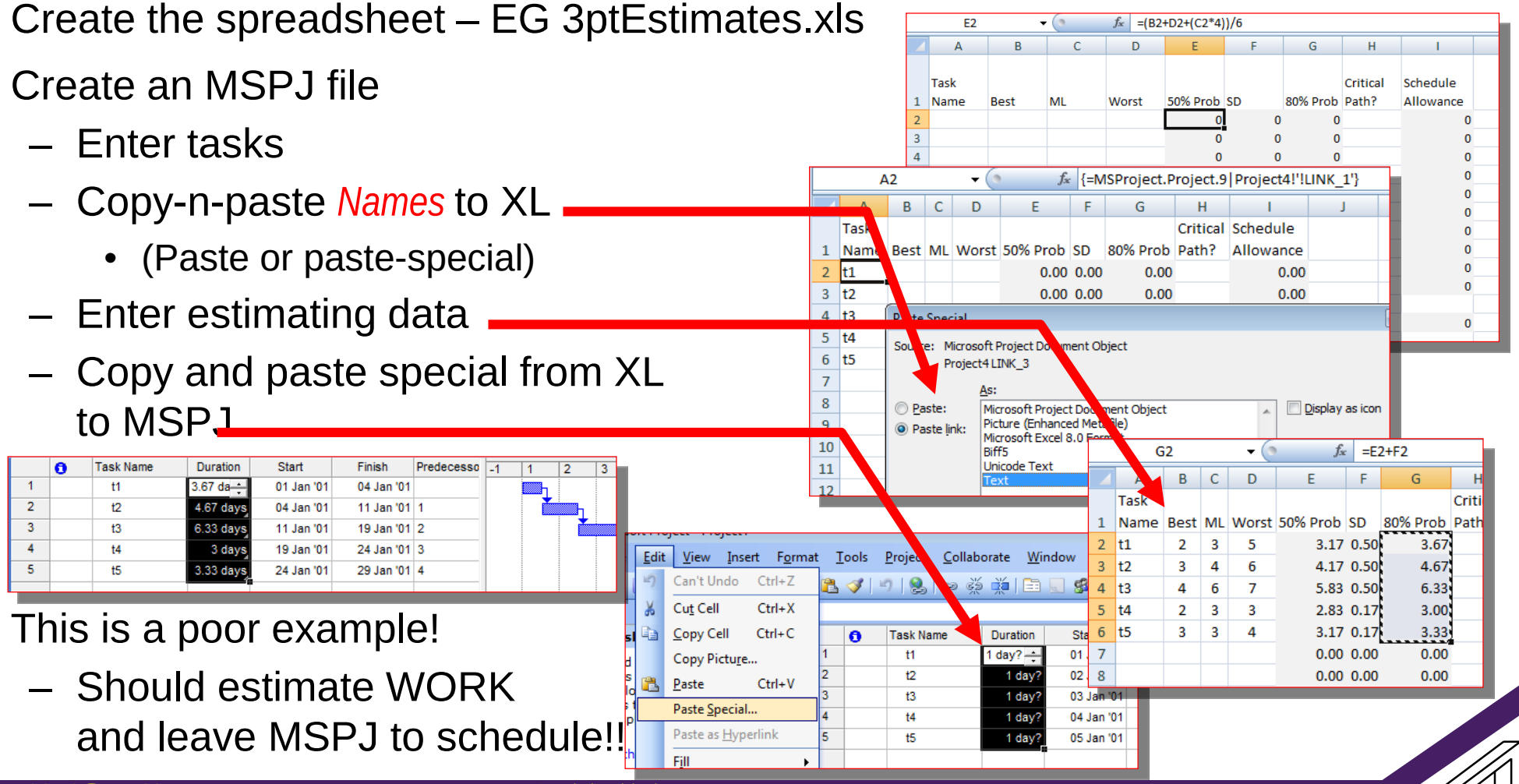
- Create the spreadsheet – EG 3ptEstimates.xls
- Create an MSPJ file
  - Enter tasks
  - Copy-n-paste *Names* to XL
    - (Paste or paste-special)
  - Enter estimating data
  - Copy and paste special from XL to MSPJ
- This is a poor example!
  - Should estimate WORK and leave MSPJ to schedule!!



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See 3pt Estimates.xls and by now you should be able to create the .mpp!

Summary

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- Once the baseline is defined and staff are executing the project's work
  - Gather data of actual work and enter to MSPJ
  - Correct setting of calculation options and tracking level are material
  - Track {Resource, Task} usage reflects data gathering choice
- Once entered data can be reported, summarised and exported in many ways

- Time to apply it all to the Case-Study

To implement EV the key factor is understanding how to judge “done” or percent complete: LML can help☺

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- For further help & assistance
  - Assist@LogicalModel.Net +44 (0) 84 52 57 57 07

- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 8

Lesson 8: Tracking The Case-Study

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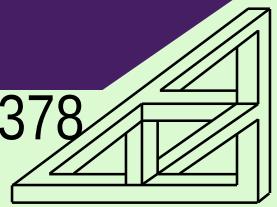

Case-Study-Intro: EV Analysis and Reporting

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- Objective: To track changes to the project and report EV for analysis
  - Analyse the project's evolving status using EV figures
- Steps
  - Establish the project baseline
  - Set status date, read the scenario and apply the progress reported
  - Unless told otherwise all tasks started and completed as planned (duration, resource usage, cost) or as soon as possible following delays
    - Remember constraints such as no Tech-I's in weeks 29 and 30
    - Remember that tasks have levelling delay that may become irrelevant due to progress based changes
- Progress reports and project office information is provided in the following pages
  - Assess the information given
  - Track the project

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Case-Study: Team's Report of History

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- Management wishes to review the historical data, current position, forecasts and recommendations on 4 weekly intervals
- MSPJ will give you the raw task level data and the BCWP, ACWP, SV, CV, SV%, CV%, CPI, SPI, TCPI, and EAC of anything you care to configure
  - Project overall status recorded against the project summary task
- Some activities can use %Complete but 0-100, 50/50, MS and MS-PC will have to use Physical % Complete (which only resolves to whole % points in MSPJ)
  - MS-PC tasks on the way to a MS may use %C until they miss a MS
  - Assume that all % complete tasks proceed at an even rate
- Reschedule the project and re-resource to accommodate the best end date & cost as each period's progress data is assessed

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Case-Study: EV Types ½*

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Task Name	Task Short Name	EV Type
Lunar Imaging System	**LIS**	-
Start-MS	S	-
Outline Design	OutD	0-100
Optics Sub-System		-
Optics Design	OD	MS-PC w3-PDR-25% w8-CDR-75%
Lens System Parameters	LSPs	0-100
Lens Fabrication	LensFab	PC
Optics Assembly	OA	PC
Optics Test	OT	0-100
Focusing Mechanics Ss		-
Focusing Mechanics Design	FMD	MS-PC w3-PDR-30%, w7-CDR-80%
Focusing Mechanics (Purchase)	FMP	PC
Electronics Ss		-
Electronics Design	ED	MS-PC w3-PDR-20%, w10-CDR-70%
Electronics Fabrication	EFab	PC
Electronics Test	ET	0-100
ElectroServo Preparation for Integration	ESI	50-50

W3 (w8 etc) means after the task's 3rd (8th) week EV is capped at this level unless the accompanying review is passed. Task end = 100%

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* EV Types are the rule that is applied to recognising what value has been earned where percent complete is too dangerous
See materials on the Web-Site for details if your unfamiliar with this aspect of EV

Case-Study: EV Types 2/2

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Task Name	Task Short Name	EV Type
Laser RangeFinder Ss		-
Laser Ranging System Tender	LRST	50-50
Laser Generator (Purchase)	LGP	25-75
Laser Positioning Controls Fabrication	LPCFab	PC
Generator & Controls Integration	LGCI	0-100
Image Buffer XSO		-
Image Storage Design	ISD	50-50
Image Store Fabrication	ISFab	MS w2-SG1-15%, w6-Sg2-50%, w10-SG3-80%
Image Store As-Built Drawings	ISABD	0-100
XSO Assembly	XA	Pc
XSO Review	XR	Pc
Intg'tn & Proving Phase		-
Assemble Sub-Systems	ASS	50-50
System Test	LISST	Pc
Accept Test	LISAT	0-100
Field Installation & Calibration	FIC	0-100
Finish-MS	F	-

W2 (w6 etc) is the week the review is expected to be held. Only the EV of the most recently passed review can be claimed (0% at start, 1005 at finish)

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Case Study:
Baseline Before Period-1 Results

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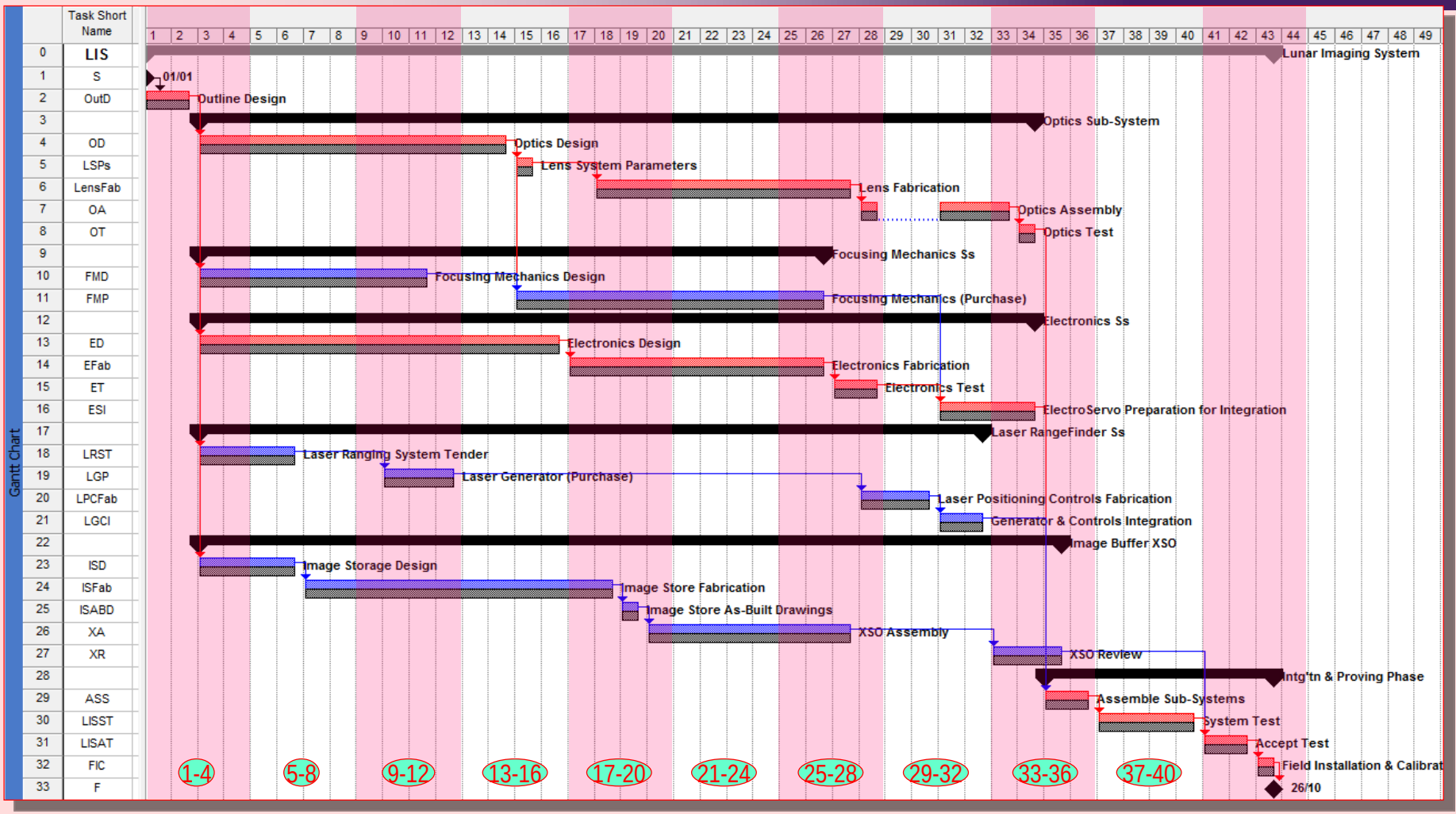

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EV And Percentages By Task-Week 1/4

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- Red divisions and numbers indicate project weeks and baseline reporting period boundaries
  - Figures are for tasks that perform to base-line

1	Period Cost	3363.30	5913.90										
OutD	Cumulative Cost	3363.30	9277.20										
	0-100	0%	100%										
2	Period Cost	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	5913.9	5913.9	2550.6	2550.6	2550.6	2550.6
OD	Cumulative Cost	3363.3	6726.6	10089.9	13453.2	16816.5	20179.8	26093.7	32007.6	34558.2	37108.8	39659.4	42210
		7.97%	15.94%	23.90%	31.87%	39.84%	47.81%	61.82%	75.83%	81.87%	87.91%	93.96%	100.00%
	Milestones PC		1-4	25% PDR			5-8	75% CDR			9-12	100%	PRR
3	Period Cost	3363.3											
LSPs	Cumulative Cost	3363.3											
	0-100	100%	13-16										
4	Period Cost	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000		
LensFab	Cumulative Cost	3000	6000	9000	12000	15000	18000	21000	24000	27000	30000		
	% Complete	(10%)	(20%)	17-20	(40%)	(50%)	(60%)	21-24	(80%)	(90%)	(100%)	25-28	
5	Period Cost	2550.6	2550.6	2550.6	2550.6								
OA	Cumulative Cost	2550.6	5101.2	7651.8	10202.4								
	% Complete	(25%)	(50%)	(75%)	(100%)	29-32							
6	Period Cost	2550.6											
OT	Cumulative Cost	2550.6											
	0-100	100%		33-36									

OD 2Wk ahead
MSPJ 75% = £31,658

OD If to plan then
TaskWk 1: BCWS = 3363.30, ACWP = 3363.30, BCWP = 3363.30
TWk 2: BCWS = 6726.60, ACWP = 6726.60 BCWP = 6726.60
TWk 3: BCWS = 10089.90, ACWP = 10089.90 BCWP = ?
Have we passed the MS ? If NO BCWP = 10089.90, yes = 10552.50 (25%)

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EV And Percentages By Task-Week 2/4

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MSPJ 42% = £20,165

MSPJ 70% = £33,608

MSPJ 65% = £20,277

Starts 2Wk early

7	Period Cost	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	5913.9	2550.6	2550.6					
FMD	Cumulative Cost	3363.3	6726.6	10089.9	13453.2	16816.5	20179.8	26093.7	28644.3	31194.9					
		10.78%	21.56%	32.34%	43.13%	53.91%	64.69%	83.65%	91.82%	100.00%					
	Milestones PC		1-4	30% PDR			5-8	80% CDR		100% PRR	9-12				
8	Period Cost	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6		
FMP	Cumulative Cost	2550.6	5101.2	7651.8	10202.4	12753	15303.6	17854.2	20404.8	22955.4	25506	28056.6	30607.2		
	% Complete	(8%)	(17%)	(25%)	(33%)	(42%)	(50%)	(58%)	(67%)	(75%)	(83%)	(92%)	(100%)		25-28
9	Period Cost	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	5913.9	2550.6	2550.6
ED	Cumulative Cost	3363.3	6726.6	10089.9	13453.2	16816.5	20179.8	23543.1	26906.4	30269.7	33633	36996.3	42910.2	45460.8	48011.4
		7.01%	14.01%	21.02%	28.02%	35.03%	42.03%	49.04%	56.04%	63.05%	70.05%	77.06%	89.38%	94.69%	100.00%
	Milestones PC		1-4	20% PDR			5-8			9-12	70% CDR			13-16	100% PRR
10	Period Cost	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6				
EFab	Cumulative Cost	2550.6	5101.2	7651.8	10202.4	12753	15303.6	17854.2	20404.8	22955.4	25506				
	% Complete	(10%)	(20%)	(30%)	(40%)	(50%)	(60%)	(70%)	(80%)	(90%)	(100%)		25-28		
11	Period Cost	2550.6	2550.6												
ET	Cumulative Cost	2550.6	5101.2												
	0-100	0%	100%	25-28											
12	Period Cost	2550.6	2550.6	2550.6	2550.6										
ESI	Cumulative Cost	2550.6	5101.2	7651.8	10202.4										
	50-50	50%	29-32		50%										

TaskWk 1: BCWS = 3363.30, ACWP = 3363.30, BCWP = 3363.30
TWk 2: BCWS = 6726.60, ACWP = 6726.60 BCWP = 6726.60
TWk 3: BCWS = 10089.90, ACWP = 10089.90 BCWP = ?
Have we passed the MS ? If NO BCWP = 9,358.47 (20%), yes = 10089.90 (21.02%)

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EV And Percentages By Task-Week 3/4

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13	Period Cost	3363.3	3363.3	3363.3	3363.3								
LRST	Cumulative Cost	3363.3	6726.6	10089.9	13453.2								
	50-50	50%	1-4		50%	5-8							
14	Period Cost	3363.3	3363.3	3363.3									
LGP	Cumulative Cost	3363.3	6726.6	10089.9									
	25-75	25%	9-12	75%									
15	Period Cost	3000	3000	3000									
LPCFab	Cumulative Cost	3000	6000	9000									
	% Complete	(33%)	(67%)	(100%)		29-32							
16	Period Cost	2550.6	2550.6										
LGCI	Cumulative Cost	2550.6	5101.2										
	0-100	0%	100%			29-32							
17	Period Cost	3363.3	3363.3	5913.9	2550.6								
ISD	Cumulative Cost	3363.3	6726.6	12640.5	15191.1								
	50-50	50%	1-4		50%								
18	Period Cost	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3
ISFab	Cumulative Cost	3363.3	6726.6	10089.9	13453.2	16816.5	20179.8	23543.1	26906.4	30269.7	33633	36996.3	40359.6
	Milestones	5-8	15%	SG1		9-12	50%	SG2		13-16	80%	SG3	100% SG4

ISD
TWk 1: BCWS = 3363.3, ACWP = 3363.3, BCWP = 50% of15,191.10
TWk 2: BCWS = 6726.6, ACWP = 6726.6, BCWP = 7,595.55
TWk 3: BCWS = 12,640.50, ACWP = 12,640.50, BCWP = 7595.55

ISFab
TWk 1: BCWS = 3363.3, ACWP = 3363.3, BCWP = 0
TWk 2: BCWS = 6726.6, ACWP = 6726.6 BCWP = 15% of 40,359.60
TWk 3: BCWS = 10,089.90, ACWP = 10,089.90, BCWP = 6,053.94

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EV And Percentages By Task-Week 4/4

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19	Period Cost	2550.6								
ISABD	Cumulative Cost	2550.6								
	0-100	100%	17-20							
20	Period Cost	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	2550.6	
XA	Cumulative Cost	2550.6	5101.2	7651.8	10202.4	12753	15303.6	17854.2	20404.8	
	% Complete	(13%)	(25%)	(38%)	(50%)	(63%)	(75%)	(88%)	(100%)	25-28
21	Period Cost	2550.6	2550.6	2550.6						
XR	Cumulative Cost	2550.6	5101.2	7651.8						
	% Complete	(33%)	(67%)	(100%)	33-36					
22	Period Cost	2550.6	2550.6							
ASS	Cumulative Cost	2550.6	5101.2	33-36						
	50-50	50%	50%							
23	Period Cost	2550.6	2550.6	2550.6	2550.6					
LISST	Cumulative Cost	2550.6	5101.2	7651.8	10202.4					
	% Complete	(25%)	(50%)	(75%)	(100%)	37-40				
24	Period Cost	2550.6	2550.6							
LISAT	Cumulative Cost	2550.6	5101.2							
	0-100	0%	100%		41-44					
25	Period Cost	2550.6								
FIC	Cumulative Cost	2550.6								
	0-100	100%	41-44							

Case-Study-1: ‘Progress’ Report Period 1 (Weeks 1 to 4) Pt1

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- All OK – To plan so far
  - Finance advise Tech-I actual costs will be £32/ hour when they start work
- Open your CaseStudy baseline (as copy? Or use Case5.2 Ready To Track.mpp)
  - Set status date to fourth Friday EG 26/1/01
  - Show progress line at status date?
    - Check BCWS is £42,910
  - Set Tech-I rate to £32 hr (125% overhead burden = £2,880/wk) from Tech-I’s first scheduled week (hint: *Resource Usage*? & *Resource Information | Costs | Cost Rate Table*)

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Case-Study: ‘Progress’ Report Period 1 (Weeks 1 to 4) Pt2

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- Set all relevant tasks to *Physical % Complete* (Refer to previous slides)
  - OutD, LSPs, OT, ET, LGCI, ISABD, LISAT, FIC are all 0-100
  - ESI, LRST, LGP, ISD, ASS are all 50-50 or 25-75
  - ISFab is MS
  - OD, FMD, ED, are all MS-PC so may stay %C for now
  - LensFab, OA, FMP, EFab, LPCFab, XA, XR, LISST are %C
- Use *Tools | Tracking | Update Project | Set 0% -100% Complete*
  - Note: *Physical % Complete* FMD 21.5% shown by MSPJ as 22% and £6,863 not £6,727 = £136, OD 15.94% vs 16% = £27, ED 14.01% = £5
  - BCWP should be = £43,937 if all non %C tasks are *Physical % Complete*
  - BCWP should be = £43,779 if tasks that can be %C are
    - ISD P%C at 50/50 yield £869 variance so £43,779 is strictly the correct figure
    - £869 variance in ISD from a 50-50% EV type is difference from £42,910

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Case-Study: Period-1 Tracked

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- Note FMD & ED set to %Complete

FMD & ED EV-Type = % Comp. 21.5% & 14.01%

Tech-I Rate Variance

Gantt Chart

	Earned Value Method	Task Short Name	Physica % Complet	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC	BAC	VAC	TCPI	EAC	VAC
0	% Con	LIS	0%	£42,910	£43,779	£42,910	£869	2%	1.02	£869	1%	1.02	£387,144	£394,984	£7,840	1	£387,144	£7,840
1	% Comp	S	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£0	£0	£0	0	£0	£0
2	Physica	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	1	£9,277	£9,277	£0	1	£9,277	£0
3	% Comp	OD	17%	£6,727	£6,727	£6,727	£0	0%	1	£0	0%	1	£42,210	£42,210	£0	1	£42,210	£0
4	Physica	LSPs	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£3,363	£3,363	£0	1	£3,363	£0
5	% Comp	ensFab	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£30,000	£30,000	£0	1	£30,000	£0
6	% Comp	OA	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£11,520	£10,202	-£1,318	1	£11,520	-£1,318
7	Physica	OT	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£2,880	£2,551	-£329	1	£2,880	-£329
8	% Comp	FMD	22%	£6,727	£6,727	£6,727	£0	0%	1	£0	0%	1	£31,195	£31,195	£0	1	£31,195	£0
9	% Comp	FMP	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£34,560	£30,607	-£3,953	1	£34,560	-£3,953
10	% Comp	ED	14%	£6,727	£6,727	£6,727	£0	0%	1	£0	0%	1	£48,011	£48,011	£0	1	£48,011	£0

- FMD & ED set to Phys % Complete

Phys % Comp. 22% & 14%

Gantt Chart

	Earned Value Method	Task Short Name	Physica % Complet	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC	BAC	VAC	TCPI	EAC	VAC
0	% Con	LIS	0%	£42,910	£43,910	£42,910	£1,000	2%	1.02	£1,000	2%	1.02	£385,987	£394,984	£8,997	1	£385,987	£8,997
1	% Comp	S	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£0	£0	£0	0	£0	£0
2	Physica	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	1	£9,277	£9,277	£0	1	£9,277	£0
3	% Comp	OD	17%	£6,727	£6,727	£6,727	£0	0%	1	£0	0%	1	£42,210	£42,210	£0	1	£42,210	£0
4	Physica	LSPs	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£3,363	£3,363	£0	1	£3,363	£0
5	% Comp	ensFab	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£30,000	£30,000	£0	1	£30,000	£0
6	% Comp	OA	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£11,520	£10,202	-£1,318	1	£11,520	-£1,318
7	Physica	OT	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£2,880	£2,551	-£329	1	£2,880	-£329
8	Physica	FMD	22%	£6,727	£6,863	£6,727	£136	2%	1.02	£136	1%	1.02	£30,576	£31,195	£620	0.99	£30,576	£620
9	% Comp	FMP	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£34,560	£30,607	-£3,953	1	£34,560	-£3,953
10	Physica	ED	14%	£6,727	£6,722	£6,727	-£5	0%	1	-£5	0%	1	£48,047	£48,011	-£36	1	£48,047	-£36

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Case-Study: Period-1 Tracked

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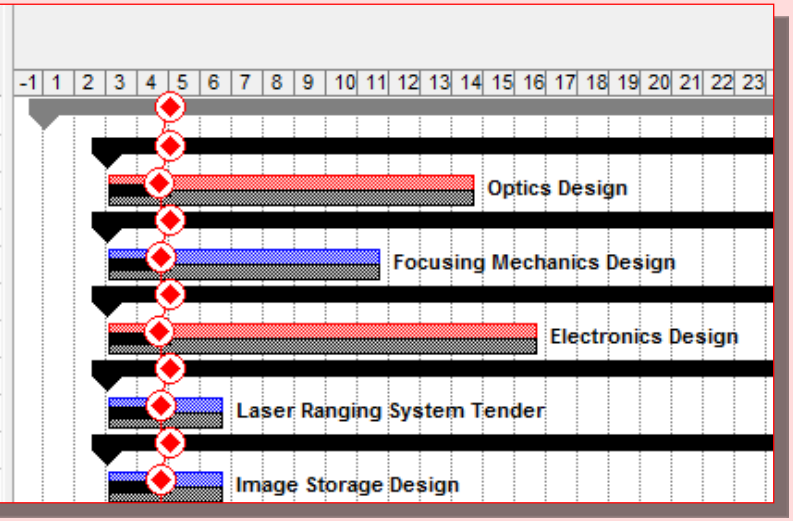
- Filtered for “in progress”

Gantt Chart

	Earned Value Method	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP
0	**% Complete**	**Lunar Imaging System**	**LIS**	**0%**	**£42,910**	**£43,937**	**£42,910**
3	**% Complete**	**Optics Sub-System**		**0%**	**£6,727**	**£6,754**	**£6,727**
4	Physical % Complete	Optics Design	OD	16%	£6,727	£6,754	£6,727
9	**% Complete**	**Focusing Mechanics Ss**		**0%**	**£6,727**	**£6,863**	**£6,727**
10	Physical % Complete	Focusing Mechanics Design	FMD	22%	£6,727	£6,863	£6,727
12	**% Complete**	**Electronics Ss**		**0%**	**£6,727**	**£6,722**	**£6,727**
13	Physical % Complete	Electronics Design	ED	14%	£6,727	£6,722	£6,727
17	**% Complete**	**Laser RangeFinder Ss**		**0%**	**£6,727**	**£6,727**	**£6,727**
18	Physical % Complete	Laser Ranging System Tender	LRST	50%	£6,727	£6,727	£6,727
22	**% Complete**	**Image Buffer XSO**		**0%**	**£6,727**	**£7,596**	**£6,727**
23	Physical % Complete	Image Storage Design	ISD	50%	£6,727	£7,596	£6,727



Period 1 (Weeks 1 to 4): All OK – To plan so far but company concerns about Tech-I resignations mean finance have directed that Tech-I actual costs will be £32/ hour when we start Tech-I tasks

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Summary Tasks Inherit CPI/ SPI

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- Note summary tasks ‘inherit’ summarised task’s performance
  - With larger figures larger variance at completion is projected

Image Buffer XSO		**0%**	**£6,727**	**£7,596**	**£6,727**	**£869**	**12%**	**1.13**	**£869**	**11%**	**1.13**	**£76,301**	**£86,158**	**£9,857**	**0.99**	**£76,301**	**£9,857**
Image Storage Deig	ISD	50%	£6,727	£7,596	£6,727	£869	12%	1.13	£869	11%	1.13	£13,453	£15,191	£1,738	0.9	£13,453	£1,738
Image Store Fab.	ISFab	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£40,360	£40,360	£0	1	£40,360	£0
Image Store Intg'tn	ISABD	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£2,551	£2,551	£0	1	£2,551	£0

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Task Usage With EV in Lower Pane Analyses Selection in Upper Pane

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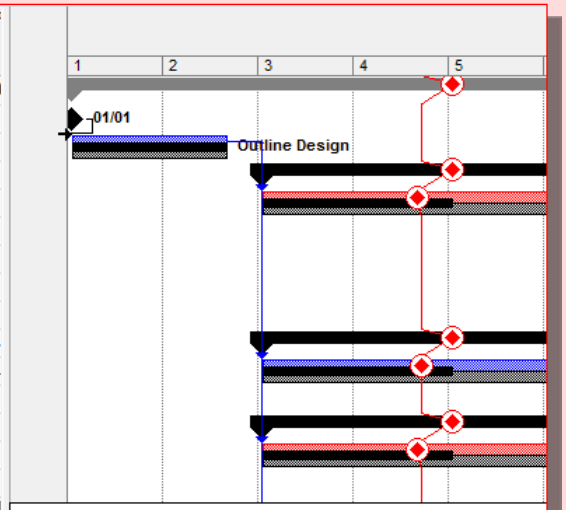
- In this case the project summary task

Gantt Chart

	Earned Value Method	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CP
0	% Complete	Lunar Imaging System	LIS	0%	£42,910	£43,937	£42,910	£1,027	2%	1.02	£1,027	2%	1.(
1	% Complete	Start-MS	S	0%	£0	£0	£0	£0	0%	0	£0	0%	
2	Physical % Complete	Outline Design	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	
3	% Complete	Optics Sub-System		0%	£6,727	£6,754	£6,727	£27	0%	1	£27	0%	
4	Physical % Complete	Optics Design	OD	16%	£6,727	£6,754	£6,727	£27	0%	1	£27	0%	
5	Physical % Complete	Lens System Parameters	LSPs	0%	£0	£0	£0	£0	0%	0	£0	0%	
6	% Complete	Lens Fabrication	ensFab	0%	£0	£0	£0	£0	0%	0	£0	0%	
7	% Complete	Optics Assembly	OA	0%	£0	£0	£0	£0	0%	0	£0	0%	
8	Physical % Complete	Optics Test	OT	0%	£0	£0	£0	£0	0%	0	£0	0%	
9	% Complete	Focusing Mechanics Ss		0%	£6,727	£6,863	£6,727	£136	2%	1.02	£136	1%	1.
10	Physical % Complete	Focusing Mechanics Design	FMD	22%	£6,727	£6,863	£6,727	£136	2%	1.02	£136	1%	1.
11	% Complete	Focusing Mechanics (Purchase	FMP	0%	£0	£0	£0	£0	0%	0	£0	0%	
12	% Complete	Electronics Ss		0%	£6,727	£6,722	£6,727	-£5	0%	1	-£5	0%	
13	Physical % Complete	Electronics Design	ED	14%	£6,727	£6,722	£6,727	-£5	0%	1	-£5	0%	
14	% Complete	Electronics Fabrication	EFab	0%	£0	£0	£0	£0	0%	0	£0	0%	



Task Usage

	TBMS-EV-Type	Earned Value Method	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP
0	-	% Complete	Lunar Imaging System	LIS	0%	£42,910	£43,937	£42,91(

Task usage with EV table and EV cells selected by Format | Details

Details	1	2	3	4	5
Work	40h	80h	200h	200h	240h
Act. W	40h	80h	200h	200h	
ACWP	£3,363	£9,277	£26,094	£42,910	
BCWP	£2,319	£4,639	£24,288	£43,937	
BCWS	£3,363	£9,277	£26,094	£42,910	
CPI	0.69	0.5	0.93	1.02	
CV	-£1,044	-£4,639	-£1,806	£1,027	
CV%	-45%	-100%	-7%	2%	
SPI	0.69	0.5	0.93	1.02	
SV	-£1,044	-£4,639	-£1,806	£1,027	
SV%	-31%	-50%	-6%	2%	

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Case-Study-2: Progress Period 2 (Wk 5-8):

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- Our Eng-O assigned to task #2 OD saved two weeks and the DrO resource was available to start early in week 7. OD therefore passed CDR (75% EV) in wk 8
  - Everything else ran to baseline

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Case-Study: Progress Period 2 (Wk 5-8):

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- Update Status Date (EG 23/2/01)
  - Maybe start with *Tools | Tracking | Update Project | To plan* as a fast update
  - Then select *Task Usage* and update OD Eng-O & DrO *Actual Work* (next slide)
    - Leave "Update task updates resource" ON so early DrO work reduces duration (or turn off & adjust by hand)
    - Watch carefully for MSPJ to remove project wk (PjWk) 13 & 14 from task
    - Set Eng-O *Work* in PjWk 9 & 10 to 0, Set DrO Actual Work in Pj-Wk 7 & 8 to 40
  - Note LFab cannot start early due to SC availability
    - Change *Levelling Delay* or perhaps add a 'Start no Earlier constraint' (*Levelling delay* is removed)
  - Perhaps try toggling *Physical % Complete* to *%Complete* on MS-PC tasks
    - Some tasks EG ED that are MS-PC, "between milestones" and on-track can use %Complete for a more precise calculation
    - You may need to re-enter *Physical % Complete* values and use F9 to trigger changes

Case-Study: Period-1 & 2 Tracking OD

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- After Period-1

Task Usage

	Task Name	Total Cost	Baseline	Variance	Actual	Remaining
4	Optics design	£42,210	£42,210	£0	£6,727	£35,483
	Optical Eng.	*£26,906*	*£26,906*	*£0*	*£6,727*	*£20,180*
	Drawing Offic	*£15,304*	*£15,304*	*£0*	*£0*	*£15,304*

Details	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Work		40h	40h	40h	40h	40h	40h	80h	80h	40h	40h	40h	40h	
Act. W		40h	40h											
Work		40h	40h	40h	40h	40h	40h	40h	40h					
Act. W		40h	40h											
Work		0h	0h	0h	0h	0h	0h	40h	40h	40h	40h	40h	40h	
Act. W														

- Default project tracking for Period-2

Task Usage

	Task Name	Total Cost	Baseline	Variance	Actual	Remaining
4	Optics design	£42,210	£42,210	£0	£20,180	£22,030
	Optical Eng.	*£26,906*	*£26,906*	*£0*	*£20,180*	*£6,727*
	Drawing Offic	*£15,304*	*£15,304*	*£0*	*£0*	*£15,304*

Details	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Work		40h	40h	40h	40h	40h	40h	80h	80h	40h	40h	40h	40h	
Act. W		40h	40h	40h	40h	40h	40h							
Work		40h	40h	40h	40h	40h	40h	40h	40h					
Act. W		40h	40h	40h	40h	40h	40h							
Work		0h	0h	0h	0h	0h	0h	40h	40h	40h	40h	40h	40h	
Act. W														

- Adjusted for Period-2 progress report

Task Usage

	Task Name	Total Cost	Baseline	Variance	Actual	Remaining
4	Optics design	£35,483	£42,210	-£6,727	£25,281	£10,202
	Optical Eng.	*£20,180*	*£26,906*	*-£6,727*	*£20,180*	*£0*
	Drawing Offic	*£15,304*	*£15,304*	*£0*	*£5,101*	*£10,202*

Details	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Work		40h	40h	40h	40h	80h	80h	40h	40h	40h	40h			
Act. W		40h	40h	40h	40h	80h	80h							
Work		40h	40h	40h	40h	40h	40h							
Act. W		40h	40h	40h	40h	40h	40h							
Work		0h	0h	0h	0h	40h	40h	40h	40h	40h	40h			
Act. W		0h	0h	0h	0h	40h	40h							

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Period-2 Tracked With Phys %C

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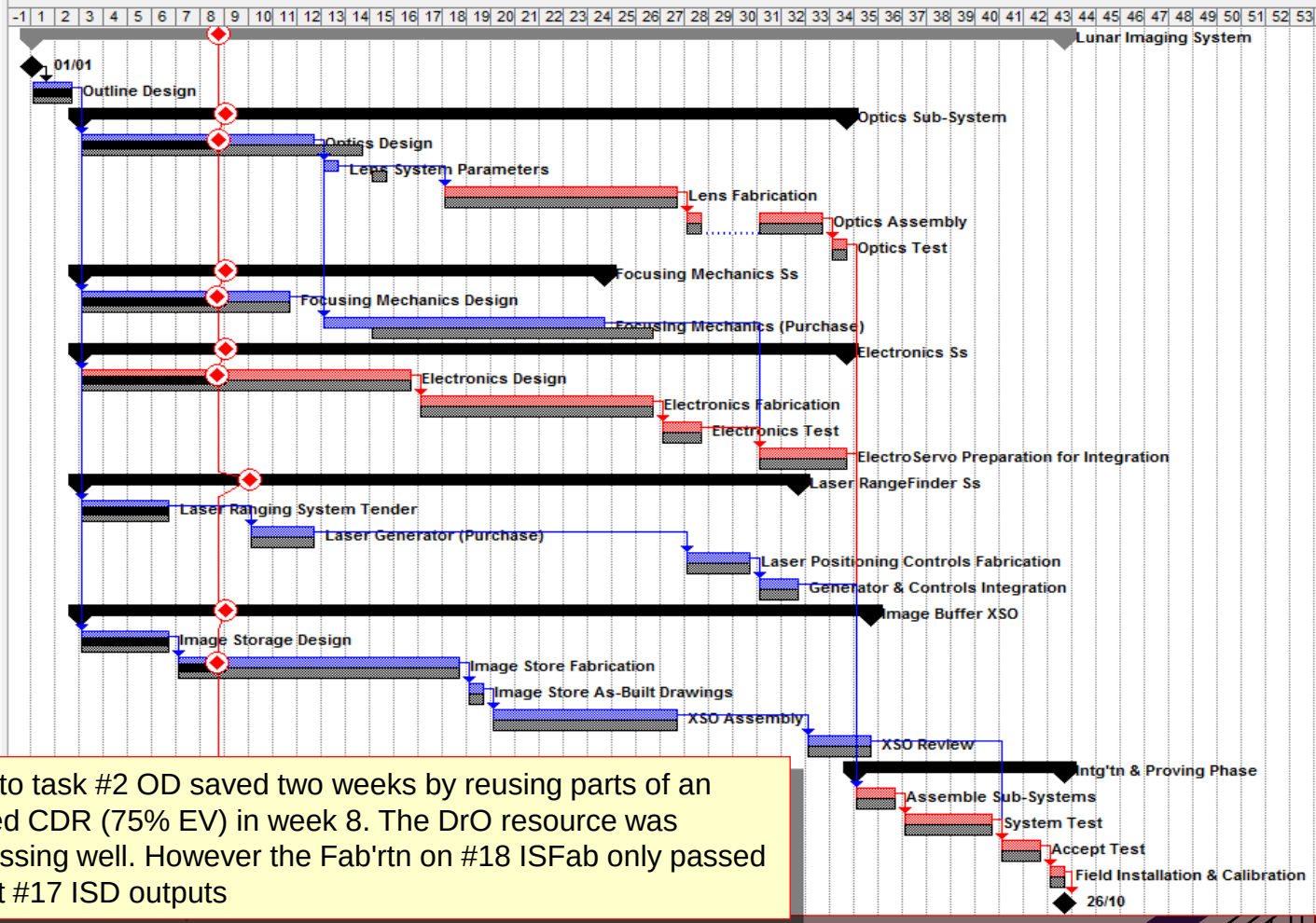
	Task Name	Phys %C	BCWS	BCWP	ACWP
0	**Lunar Imaging Syste**	**0%**	**£105,188**	**£116,074**	**£110,289**
1	Start-MS	0%	£0	£0	£0
2	Outline Design	100%	£9,277	£9,277	£9,277
3	**Optics Sub-System**	**0%**	**£20,180**	**£31,658**	**£25,281**
4	Optics Design	75%	£20,180	£31,658	£25,281
5	Lens System Paran	0%	£0	£0	£0
6	Lens Fabrication	0%	£0	£0	£0
7	Optics Assembly	0%	£0	£0	£0
8	Optics Test	0%	£0	£0	£0
9	**Focusing Mechanics**	**0%**	**£20,180**	**£20,277**	**£20,180**
10	Focusing Mechanic	65%	£20,180	£20,277	£20,180
11	Focusing Mechanic	0%	£0	£0	£0
12	**Electronics Ss**	**0%**	**£20,180**	**£20,165**	**£20,180**
13	Electronics Design	42%	£20,180	£20,165	£20,180
14	Electronics Fabrica	0%	£0	£0	£0
15	Electronics Test	0%	£0	£0	£0
16	ElectroServo Prepa	0%	£0	£0	£0
17	**Laser RangeFinder S**	**0%**	**£13,453**	**£13,453**	**£13,453**
18	Laser Ranging Sys	100%	£13,453	£13,453	£13,453
19	Laser Generator (P	0%	£0	£0	£0
20	Laser Positioning C	0%	£0	£0	£0
21	Generator & Contro	0%	£0	£0	£0
22	**Image Buffer XSO**	**0%**	**£21,918**	**£21,245**	**£21,918**
23	Image Storage Desi	100%	£15,191	£15,191	£15,191
24	Image Store Fabrica	15%	£6,727	£6,054	£6,727
25	Image Store As-Bui	0%	£0	£0	£0
26	XSO Assembly	0%	£0	£0	£0
27	XSO Review	0%	£0	£0	£0
28					
29					
30					
31					
32					
33					



Gantt Chart

Period 2 (Wk 5-8): Our Eng-O assigned to task #2 OD saved two weeks by reusing parts of an older, proven design. OD therefore passed CDR (75% EV) in week 8. The DrO resource was available in week 7 and so we are progressing well. However the Fab'rtn on #18 ISFab only passed SG1 with reservation and concerns about #17 ISD outputs

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Case-Study-3: Period 3 (Wks 9-12) Progress Report

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- Status Report
  - OD finished Wk12
  - An Eng-O was needed on #18 ISFab in weeks 11 & 12 to correct issues, and SG-2 review will now be held week 13 – EV remains 15%
  - Everything else is to plan
- Try deciding how to track with out further instructions
  - Instructions are given on following slides

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Case-Study: Period 3 (Wks 9-12) Tracking Instructions

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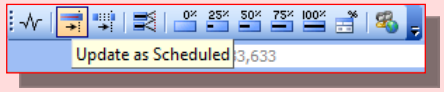
- Tracking: Start by setting the status date! (EG 23/3/01)
  - Mark OD 100% Complete (Perhaps via *Tracking Toolbar?*) & Phys.%C
  - Set FMD to be 100% Complete & P%C



  - Track ED as scheduled
    - Previously given EV table shows ED is 70.05% Phys%C
    - Note £25 variance between spreadsheet and MSPJ's calculation

9	Period Cost	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	3363.3	5913.9	2550.6	2550.6	
ED	Cumulative Cost	3363.3	6726.6	10089.9	13453.2	16816.5	20179.8	23543.1	26906.4	30269.7	33633	36996.3	42910.2	45460.8	48011.4	
		7.01%	14.01%	21.02%	28.02%	35.03%	42.03%	49.04%	56.04%	63.05%	70.05%	77.06%	89.38%	94.69%	100.00%	
	Milestones PC				**20% PDR**						**70% CDR**				**100%**	PRR

  - Set LGP 100% Complete & P%C

Case-Study: Period 3 (Wks 9-12) Tracking Instructions

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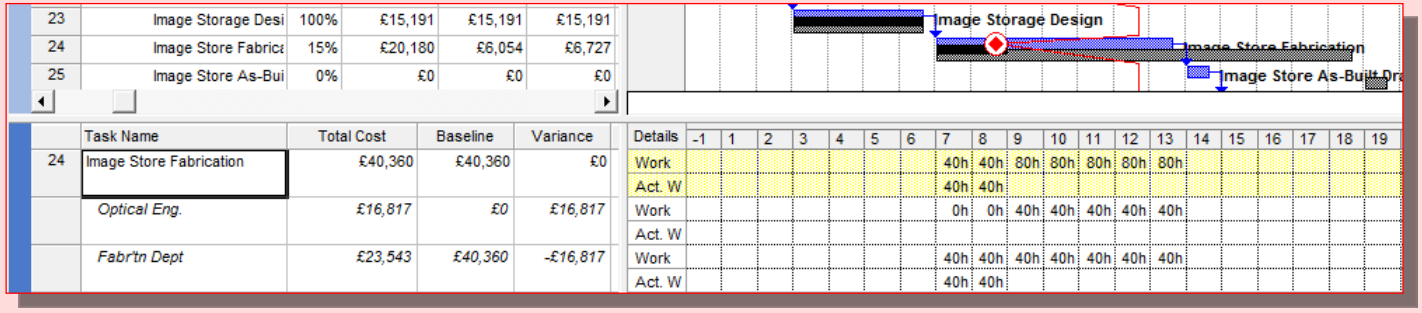
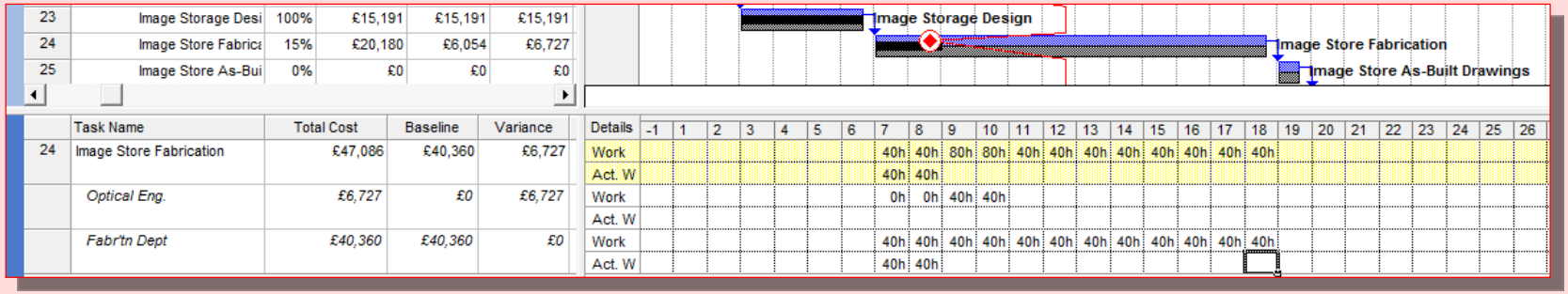
- Tracking Instructions continued
  - Assign an Eng-O to ISFab
    - MSPJ will assume full time for full duration so correct MSPJ's work calculation via Task-Usage (or Resource Usage) and restore Fab'rtn Dept's planned work





- Then track Fab'rtn Dept. effort for weeks 9 to 12

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Case-Study: Period-3 Tracked

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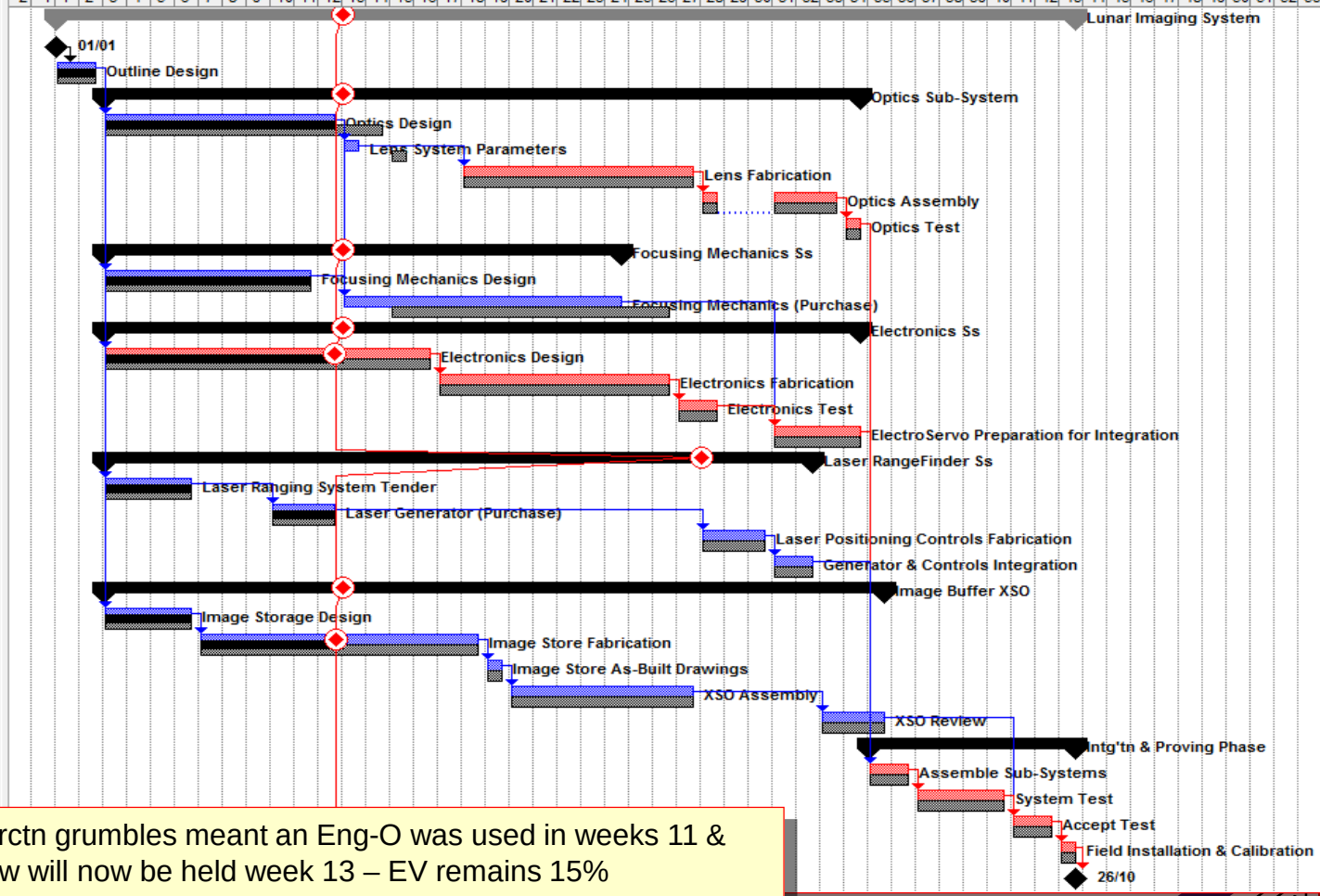
	Task Name	Phys %C	BCWS	BCWP	ACWP
0	**Lunar Imaging Syste**	**0%**	**£170,128**	**£161,078**	**£175,229**
1	Start-MS	0%	£0	£0	£0
2	Outline Design	100%	£9,277	£9,277	£9,277
3	**Optics Sub-System**	**0%**	**£37,109**	**£42,210**	**£35,483**
4	Optics Design	100%	£37,109	£42,210	£35,483
5	Lens System Paran	0%	£0	£0	£0
6	Lens Fabrication	0%	£0	£0	£0
7	Optics Assembly	0%	£0	£0	£0
8	Optics Test	0%	£0	£0	£0
9	**Focusing Mechanics**	**0%**	**£31,195**	**£31,195**	**£31,195**
10	Focusing Mechanic	100%	£31,195	£31,195	£31,195
11	Focusing Mechanic	0%	£0	£0	£0
12	**Electronics Ss**	**0%**	**£33,633**	**£33,608**	**£33,633**
13	Electronics Design	70%	£33,633	£33,608	£33,633
14	Electronics Fabrica	0%	£0	£0	£0
15	Electronics Test	0%	£0	£0	£0
16	ElectroServo Prepa	0%	£0	£0	£0
17	**Laser RangeFinder S**	**0%**	**£23,543**	**£23,543**	**£23,543**
18	Laser Ranging Sys	100%	£13,453	£13,453	£13,453
19	Laser Generator (P	100%	£10,090	£10,090	£10,090
20	Laser Positioning C	0%	£0	£0	£0
21	Generator & Contro	0%	£0	£0	£0
22	**Image Buffer XSO**	**0%**	**£35,371**	**£21,245**	**£42,098**
23	Image Storage Desi	100%	£15,191	£15,191	£15,191
24	Image Store Fabrica	15%	£20,180	£6,054	£26,906
25	Image Store As-Bui	0%	£0	£0	£0
26	XSO Assembly	0%	£0	£0	£0
27	XSO Review	0%	£0	£0	£0
28	**Intg'tn & Proving Pha**	**0%**	**£0**	**£0**	**£0**
29	Assemble Sub-Sys	0%	£0	£0	£0
30	System Test	0%	£0	£0	£0



Gantt Chart

Period 3 (Wk 9-12): OD finished Wk12. Fab'rctn grumbles meant an Eng-O was used in weeks 11 & 12 to sort out ISFab, and planned SG-2 review will now be held week 13 – EV remains 15%

Case-Study-4: Progress Report Period-4 (wks13-16)

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- Status report
  - When OD finished early we couldn't pass both weeks gained to LSPs, but were able to start 1 week earlier than planned
    - FMP was able to start 2 Wks early (at the Tech-I's increased rate of £2,880)
  - ED finished week 16
  - Extra Eng-O on ISFab was reclaimed by their project first thing Monday week13 (i.e. no further actual cost) and then Fab'rtn Dept's inspection team failed ISFab at delayed Stage Gate-2!
    - ISD must be redone (original resources & duration again!) to provide fit inputs
    - Re-run of ISD is now half-way through and expected to finish week 18
    - ISFab's Fab'rtn resource has continued to book full-time to ISFab despite no progress possible until ISD completes. Completion now expected week 25 with resultant schedule impact to dependant activities

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Case-Study: Tracking Period-4 (wks13-16):

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- Tracking: Update *Status Date !*
  - Try before looking at hints on subsequent slides

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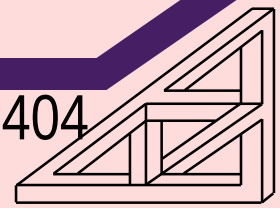

Case-Study: Tracking Period-4 (wks13-16):

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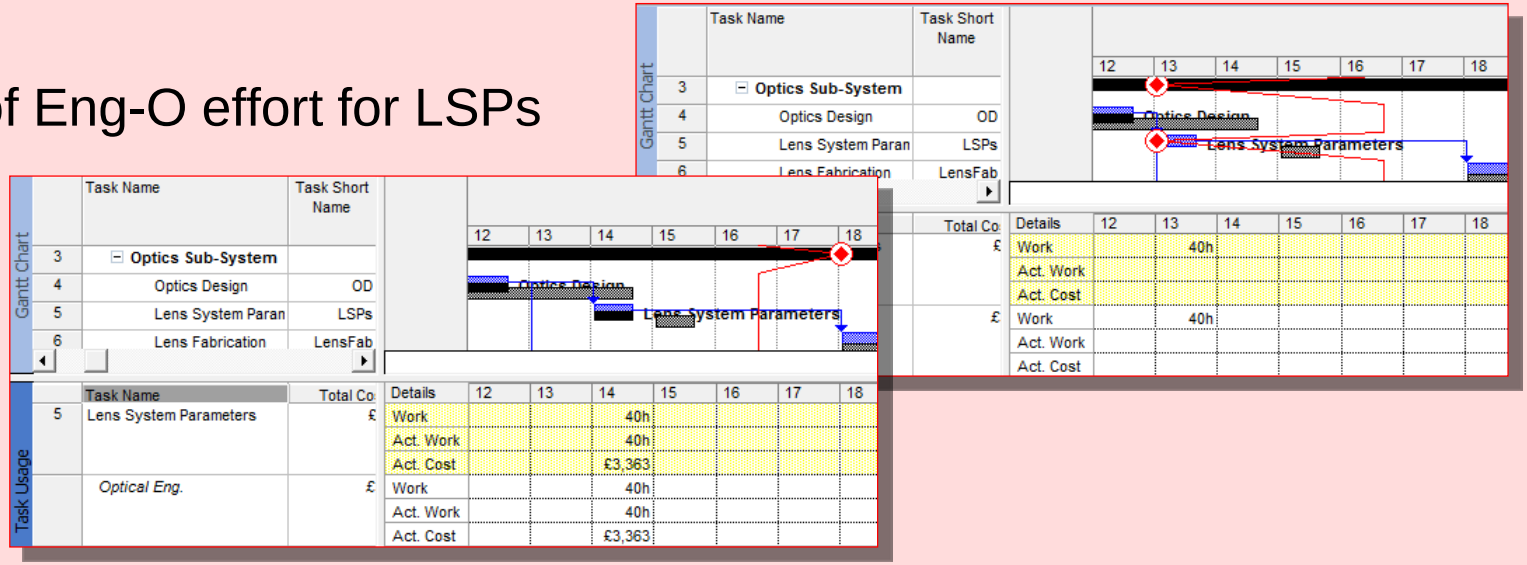
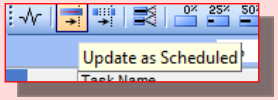
- Tracking Cont.
  - Track 40hr of Eng-O effort for LSPs in week 14



  - Early completion of OD and available Tech-I allows FMP to start Wk 13
  - ED Completes as Scheduled



Case-Study: Tracking Period-4 ISFab Issues

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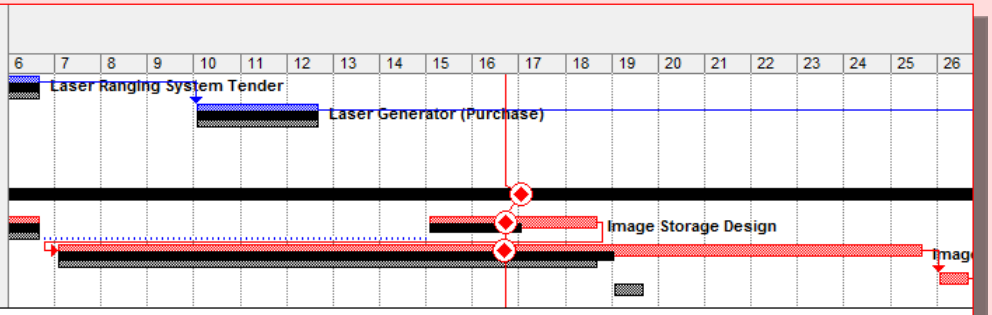
- Tracking continued
- ISD Restarts (EV drops back to 50%) with 3Wks Eng-O and 2Wks DrO
  - ISFab work rescheduled and Fab'rtn time booked

Gantt Chart

	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP
18	Laser Ranging Sys	LRST	100%	£13,453	£13,453	£13,453
19	Laser Generator (P	LGP	100%	£10,090	£10,090	£10,090
20	Laser Positioning C	LPCFab	0%	£0	£0	£0
21	Generator & Contro	LGCI	0%	£0	£0	£0
22	**Image Buffer XSO**		**0%**	**£48,824**	**£13,650**	**£62,277**
23	Image Storage Desi	ISD	50%	£15,191	£7,596	£21,918
24	Image Store Fabrica	ISFab	15%	£33,633	£6,054	£40,360
25	Image Store As-Bui	ISABD	0%	£0	£0	£0



Task Usage

	Task Name	Total Cost	Baseline	Variance	Actual
23	Image Storage Design	£30,382	£15,191	£15,191	£21,918
	Optical Eng.	*£20,180*	*£10,090*	*£10,090*	*£16,817*
	Drawing Office	*£10,202*	*£5,101*	*£5,101*	*£5,101*
24	Image Store Fabrication	£70,629	£40,360	£30,270	£47,086
	Optical Eng.	*£6,727*	*£0*	*£6,727*	*£6,727*
	Fabr'tn Dept	*£63,903*	*£40,360*	*£23,543*	*£40,360*

Details	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Work	40h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h	80h	40h								
Act. Work	40h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h										
Work	0h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h	40h									
Act. Work	0h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h										
Work	40h	0h	0h	0h	0h	0h	0h	0h	0h	0h	0h	40h	40h								
Act. Work	40h																				
Work		40h	40h	40h	40h	80h	80h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	
Act. Work		40h	40h	40h	40h	80h	80h	40h	40h	40h	40h	40h	40h								
Work		0h	0h	0h	0h	40h	40h														
Act. Work		0h	0h	0h	0h	40h	40h														
Work		40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	
Act. Work		40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h								

Case-Study: At Period-4 Part Tracked

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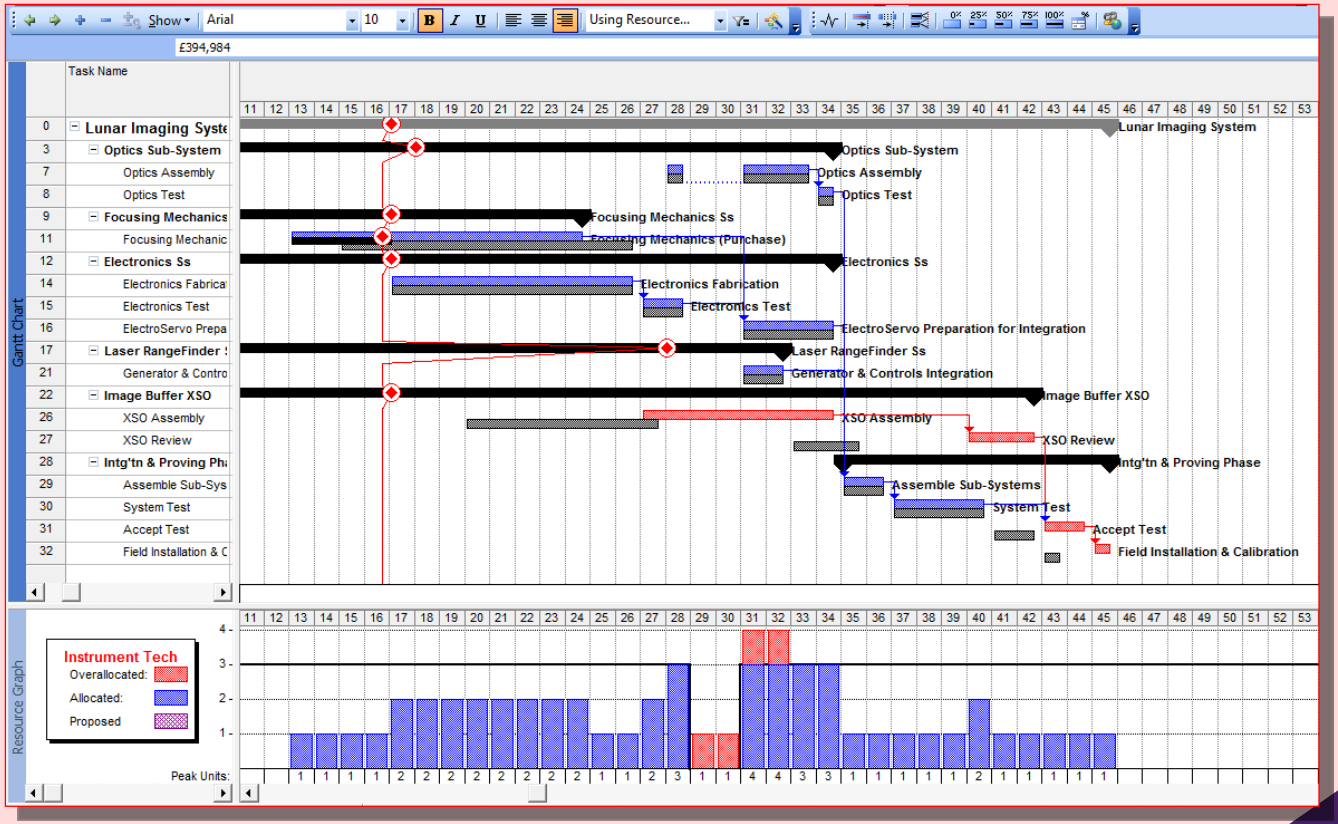
- Rescheduling of work has created over-allocations for the Tech-I

- Tech-I over-load may NOT be worth resolving this period

Filtered for Tech-I



Case-Study: Period-4 Tracked

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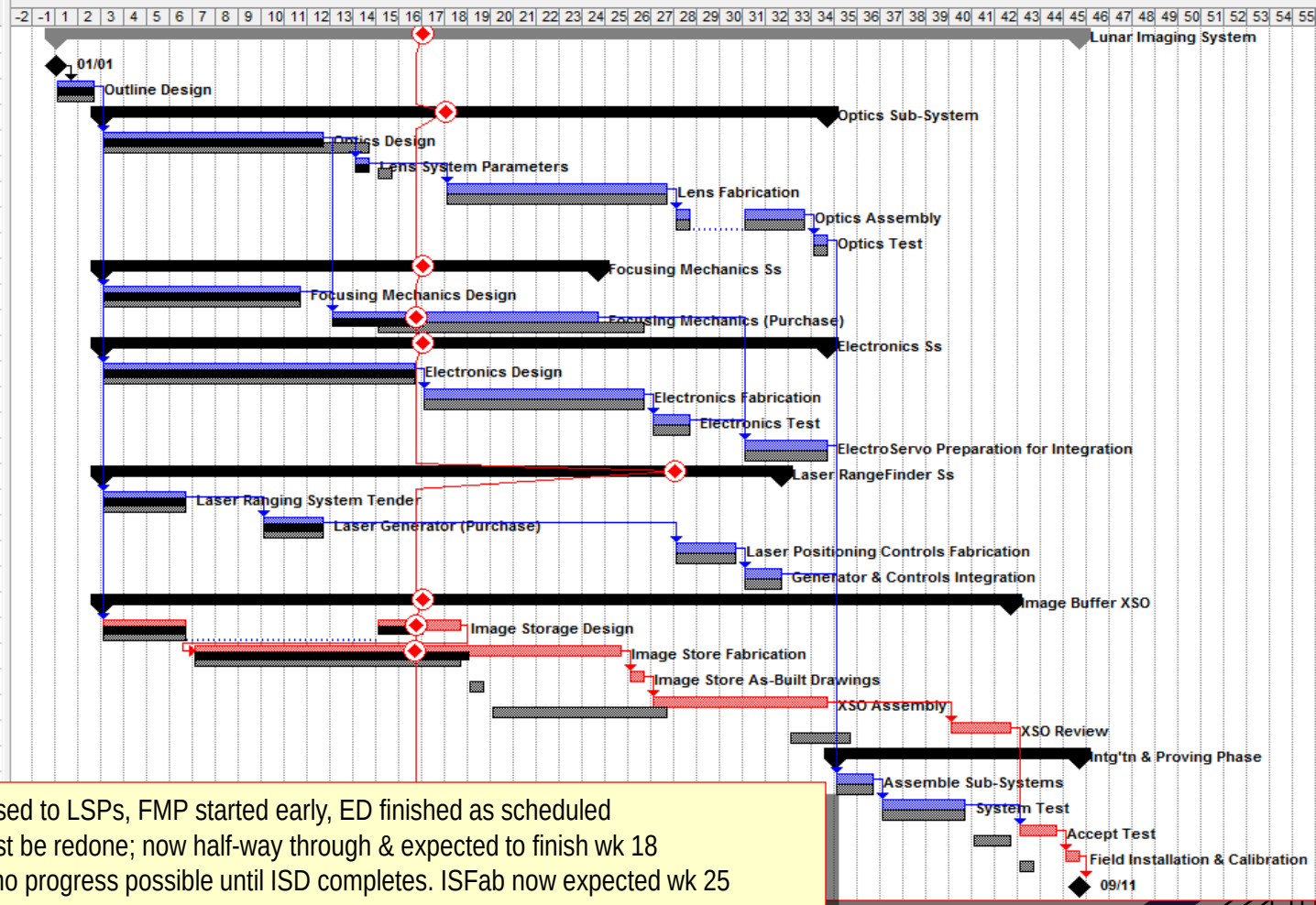
	Task Name	Phys %C	BCWS	BCWP	ACWP
0	**Lunar Imaging Syste**	**0%**	**£211,525**	**£181,452**	**£224,671**
1	Start-MS	0%	£0	£0	£0
2	Outline Design	100%	£9,277	£9,277	£9,277
3	**Optics Sub-System**	**0%**	**£45,573**	**£45,573**	**£38,847**
4	Optics Design	100%	£42,210	£42,210	£35,483
5	Lens System Paran	100%	£3,363	£3,363	£3,363
6	Lens Fabrication	0%	£0	£0	£0
7	Optics Assembly	0%	£0	£0	£0
8	Optics Test	0%	£0	£0	£0
9	**Focusing Mechanics**	**0%**	**£36,296**	**£41,397**	**£42,715**
10	Focusing Mechanic	100%	£31,195	£31,195	£31,195
11	Focusing Mechanic	0%	£5,101	£10,202	£11,520
12	**Electronics Ss**	**0%**	**£48,011**	**£48,011**	**£48,011**
13	Electronics Design	100%	£48,011	£48,011	£48,011
14	Electronics Fabrica	0%	£0	£0	£0
15	Electronics Test	0%	£0	£0	£0
16	ElectroServo Prepa	0%	£0	£0	£0
17	**Laser RangeFinder S**	**0%**	**£23,543**	**£23,543**	**£23,543**
18	Laser Ranging Sys	100%	£13,453	£13,453	£13,453
19	Laser Generator (P	100%	£10,090	£10,090	£10,090
20	Laser Positioning C	0%	£0	£0	£0
21	Generator & Contro	0%	£0	£0	£0
22	**Image Buffer XSO**	**0%**	**£48,824**	**£13,650**	**£62,277**
23	Image Storage Desi	50%	£15,191	£7,596	£21,918
24	Image Store Fabrica	15%	£33,633	£6,054	£40,360
25	Image Store As-Bui	0%	£0	£0	£0
26	XSO Assembly	0%	£0	£0	£0
27	XSO Review	0%	£0	£0	£0
28	**Intg'tn & Proving Pha**	**0%**	**£0**	**£0**	**£0**



Gantt Chart

Period 4 (wk13-16): Only 1W gained by OD passed to LSPs, FMP started early, ED finished as scheduled
ISFab failed at delayed SG-2! EV stays 15%. ISD must be redone; now half-way through & expected to finish wk 18
SRA's Fab'rtn booking full-time to #18 ISFab despite no progress possible until ISD completes. ISFab now expected wk 25

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Case-Study-5: Progress Report Period-5 (Wks17-20)

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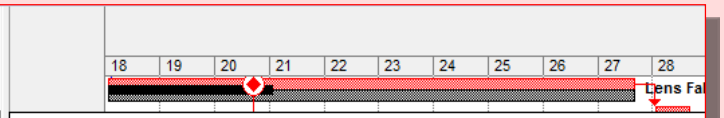
- Status
  - LensFab started according to contracted dates (IE schedule advances in earlier work lost)
    - The S-C on LensFab has charged £5k/week rather than baseline £3k reporting poor input documents from us causing costs
    - Their EV system reports BCWP of 6k (IE 20% of task BAC)

4	Period Cost	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
LensFab	Cumulative Cost	3000	6000	9000	12000	15000	18000	21000	24000	27000	30000
	% Complete	(10%)	(20%)	(30%)	(40%)	(50%)	(60%)	(70%)	(80%)	(90%)	(100%)

    - Outlook is £75,000 at completion

Gantt Chart

	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC-cpi	BAC	VAC	TCPI	VAC
6	Lens Fabric	LensFab	20%	£9,000	£6,000	£15,000	-£3,000	-33%	0.67	-£9,000	-150%	0.4	£75,000	£30,000	-£45,000	1.6	-£45,000



Task Usage

	Task Name	Total Cost	Baseline	Variance	Actual	Remaining
6	Lens Fabrication	£50,000	£30,000	£20,000	£15,000	£35,000
	SubCon	*£50,000*	*£30,000*	*£20,000*	*£15,000*	*£35,000*

Details	18	19	20	21	22	23	24	25	26	27	28
Work	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	
Act. Work	40h	40h	40h								
Act. Cost	£5,000	£5,000	£5,000								
Base. Cost	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	
Work	40h	40h	40h	40h	40h	40h	40h	40h	40h	40h	
Act. Work	40h	40h	40h								
Act. Cost	£5,000	£5,000	£5,000								
Base. Cost	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	£3,000	

Case-Study: Period-5 Status Cont.

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- ISD re-run completed wk 18
- Original Fab'rtn resource charged to ISFab for full period
  - Fab'rtn Dept doubled resources (and costs) assigned to ISFab when ISD completed
    - Expected completion date still Wk 25 (Costs therefore escalating)
  - Consider if you want to amend Fab'rtn units to 200% in *Resource Information | General | Resource Availability*
  - ISFab SG-2 (50% Milestone) passed at second attempt on Friday week 20
- Everything else (FMP and EFab) ran to revised plan

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Case-Study: Tracking

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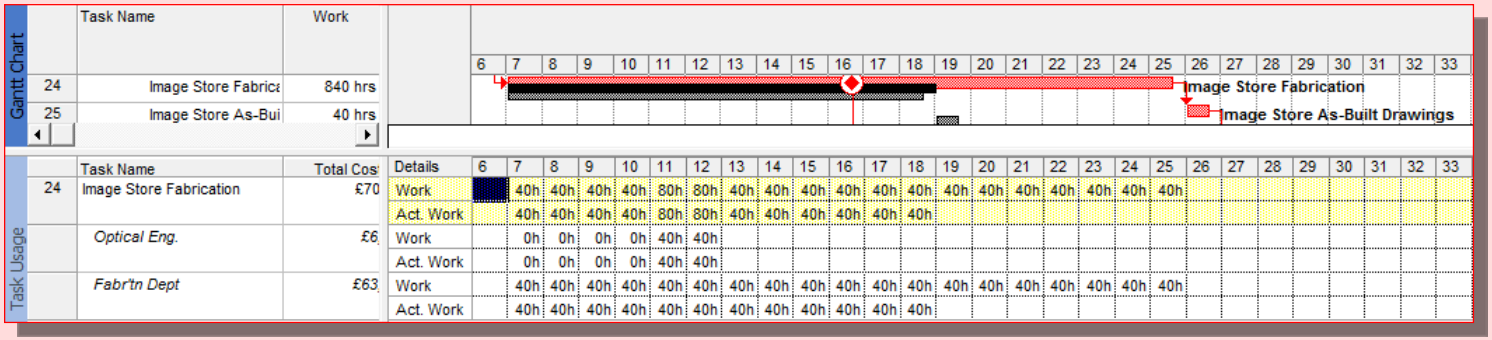
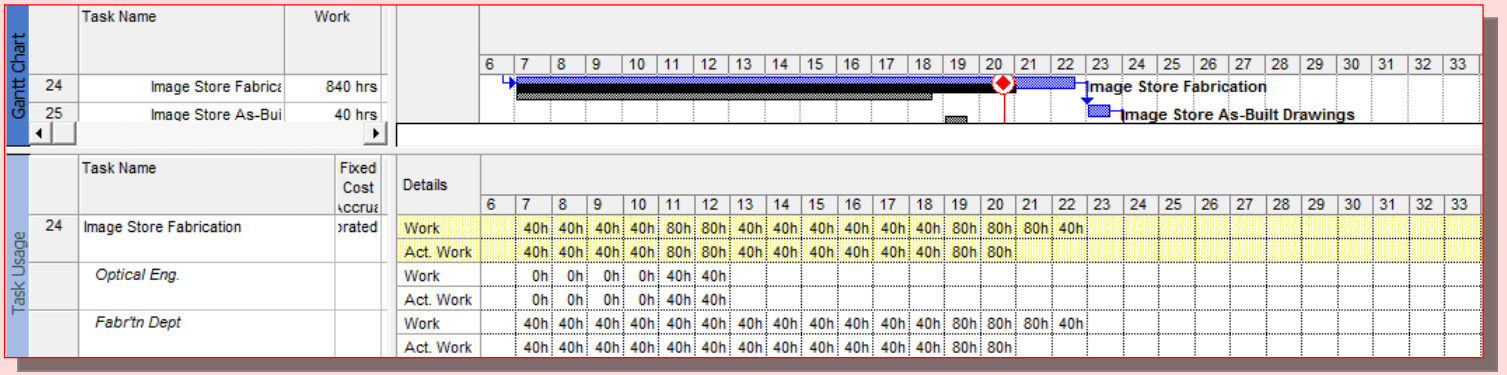
- ISFab period-4: Expected end week 25 and 840hrs work



- ISFab period-5: Still 840hrs work but expected end date now in wk-22



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Case-Study: Period-5 EV Summary

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Filtered for BCWS > 0
IE Should have started by now

Lunar Imaging System

	Task Name	Task Short Name	Phys %	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC-cpi	BAC	VAC	TCPI	VAC
0	**Lunar Imaging**	**LIS**	**0%**	**£252,758**	**£229,578**	**£291,355**	**-£23,180**	**-9%**	**0.91**	**-£61,777**	**-26%**	**0.79**	**£501,270**	**£394,984**	**-£106,286**	**1.6**	**-£106,286**
2	Outline Design	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	1	£9,277	£9,277	£0	1	£0
3	**Optics Sub-Sy**		**0%**	**£54,573**	**£51,573**	**£53,847**	**-£3,000**	**-5%**	**0.95**	**-£2,273**	**-4%**	**0.96**	**£92,220**	**£88,326**	**-£3,894**	**1.07**	**-£3,894**
4	Optics Desi	OD	100%	£42,210	£42,210	£35,483	£0	0%	1	£6,727	15%	1.19	£35,483	£42,210	£6,727	0	£6,727
5	Lens Syste	LSPs	100%	£3,363	£3,363	£3,363	£0	0%	1	£0	0%	1	£3,363	£3,363	£0	1	£0
6	Lens Fabric	LensFab	20%	£9,000	£6,000	£15,000	-£3,000	-33%	0.67	-£9,000	-150%	0.4	£75,000	£30,000	-£45,000	1.6	-£45,000
9	**Focusing Mec**		**0%**	**£46,499**	**£51,600**	**£54,235**	**£5,101**	**10%**	**1.11**	**-£2,635**	**-5%**	**0.95**	**£64,958**	**£61,802**	**-£3,156**	**1.35**	**-£3,156**
10	Focusing M	FMD	100%	£31,195	£31,195	£31,195	£0	0%	1	£0	0%	1	£31,195	£31,195	£0	1	£0
11	Focusing M	FMP	0%	£15,304	£20,405	£23,040	£5,101	33%	1.33	-£2,635	-12%	0.89	£34,560	£30,607	-£3,953	1.35	-£3,953
12	**Electronics S**		**0%**	**£58,214**	**£58,214**	**£59,531**	**£0**	**0%**	**1**	**-£1,318**	**-2%**	**0.98**	**£90,831**	**£88,821**	**-£2,010**	**1.04**	**-£2,010**
13	Electronics	ED	100%	£48,011	£48,011	£48,011	£0	0%	1	£0	0%	1	£48,011	£48,011	£0	1	£0
14	Electronics	EFab	0%	£10,202	£10,202	£11,520	£0	0%	1	-£1,318	-12%	0.89	£28,800	£25,506	-£3,294	1.09	-£3,294
17	**Laser RangeF**		**0%**	**£23,543**	**£23,543**	**£23,543**	**£0**	**0%**	**1**	**£0**	**0%**	**1**	**£37,644**	**£37,644**	**£0**	**1**	**£0**
18	Laser Rang	LRST	100%	£13,453	£13,453	£13,453	£0	0%	1	£0	0%	1	£13,453	£13,453	£0	1	£0
19	Laser Gene	LGP	100%	£10,090	£10,090	£10,090	£0	0%	1	£0	0%	1	£10,090	£10,090	£0	1	£0
22	**Image Buffer**		**0%**	**£60,652**	**£35,371**	**£90,922**	**-£25,281**	**-41%**	**0.58**	**-£55,551**	**-157%**	**0.39**	**£221,471**	**£86,158**	**-£135,313**	**10.66**	**-£135,313**
23	Image Stora	ISD	100%	£15,191	£15,191	£30,382	£0	0%	1	-£15,191	-100%	0.5	£30,382	£15,191	-£15,191	0	-£15,191
24	Image Store	ISFab	50%	£40,360	£20,180	£60,539	-£20,180	-50%	0.5	-£40,360	-200%	0.33	£121,079	£40,360	-£80,719	-1	-£80,719
25	Image Store	ISABD	0%	£2,551	£0	£0	-£2,551	-100%	0	£0	0%	0	£2,551	£2,551	£0	1	£0
26	XSO Assem	XA	0%	£2,551	£0	£0	-£2,551	-100%	0	£0	0%	0	£23,040	£20,405	-£2,635	1	-£2,635

Case-Study: Period-5 Cost & Schedule Overview

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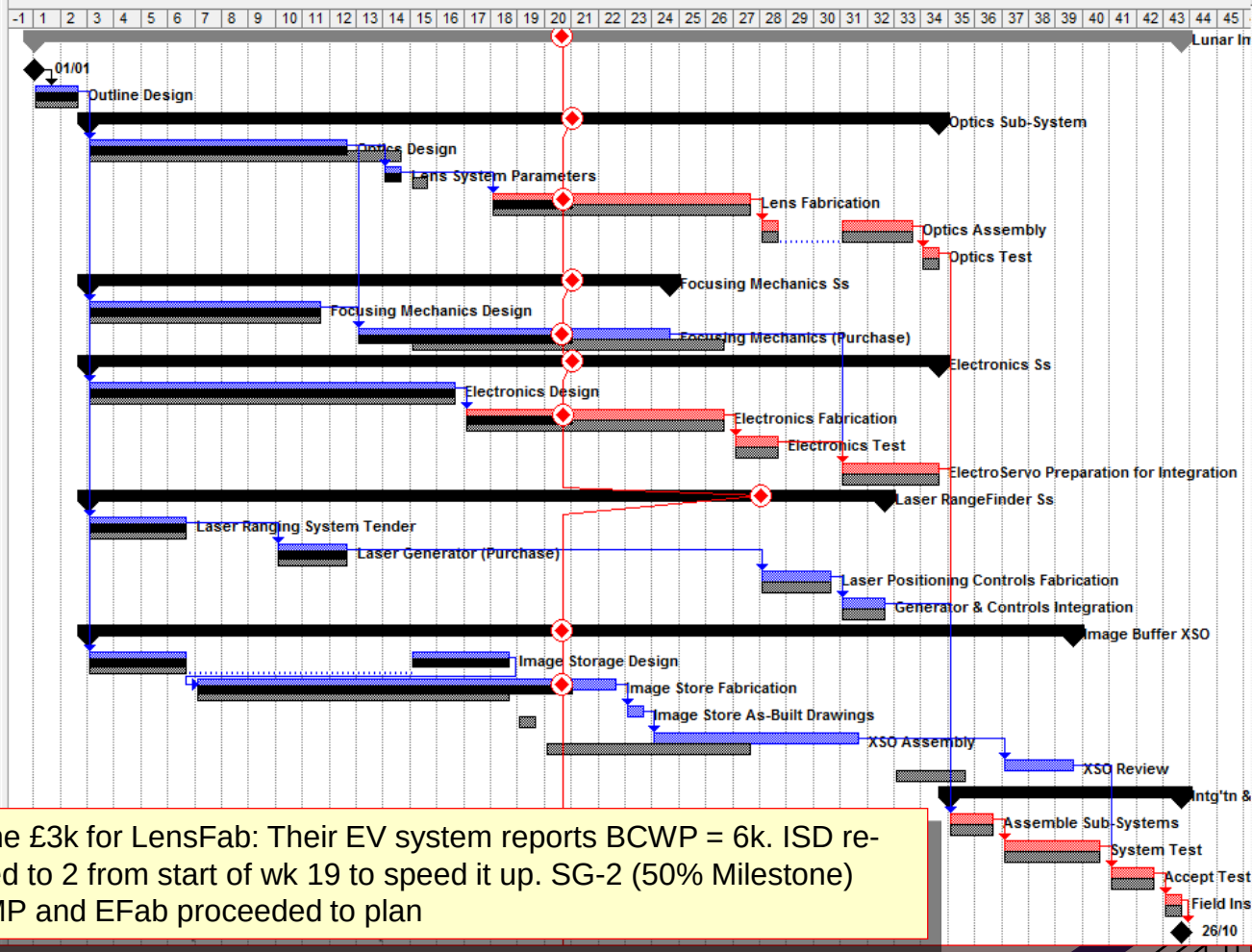
	Task Name	Total Cost	Baseline	Variance	Actual	Remaining
0	**Lunar Imaging Syste**	**£477,835**	**£394,984**	**£82,851**	**£291,355**	**£186,481**
1	Start-MS	£0	£0	£0	£0	£0
2	Outline Design	£9,277	£9,277	£0	£9,277	£0
3	**Optics Sub-System**	**£103,247**	**£88,326**	**£14,920**	**£53,847**	**£49,400**
4	Optics Design	£35,483	£42,210	-£6,727	£35,483	£0
5	Lens System Paran	£3,363	£3,363	£0	£3,363	£0
6	Lens Fabrication	£50,000	£30,000	£20,000	£15,000	£35,000
7	Optics Assembly	£11,520	£10,202	£1,318	£0	£11,520
8	Optics Test	£2,880	£2,551	£329	£0	£2,880
9	**Focusing Mechanics**	**£65,755**	**£61,802**	**£3,953**	**£54,235**	**£11,520**
10	Focusing Mechanic	£31,195	£31,195	£0	£31,195	£0
11	Focusing Mechanic	£34,560	£30,607	£3,953	£23,040	£11,520
12	**Electronics Ss**	**£94,091**	**£88,821**	**£5,270**	**£59,531**	**£34,560**
13	Electronics Design	£48,011	£48,011	£0	£48,011	£0
14	Electronics Fabrica	£28,800	£25,506	£3,294	£11,520	£17,280
15	Electronics Test	£5,760	£5,101	£659	£0	£5,760
16	ElectroServo Prepa	£11,520	£10,202	£1,318	£0	£11,520
17	**Laser RangeFinder S**	**£44,303**	**£37,644**	**£6,659**	**£23,543**	**£20,760**
18	Laser Ranging Sys	£13,453	£13,453	£0	£13,453	£0
19	Laser Generator (P	£10,090	£10,090	£0	£10,090	£0
20	Laser Positioning C	£15,000	£9,000	£6,000	£0	£15,000
21	Generator & Contro	£5,760	£5,101	£659	£0	£5,760
22	**Image Buffer XSO**	**£135,242**	**£86,158**	**£49,084**	**£90,922**	**£44,321**
23	Image Storage Desi	£30,382	£15,191	£15,191	£30,382	£0
24	Image Store Fabrica	£70,629	£40,360	£30,270	£60,539	£10,090
25	Image Store As-Bui	£2,551	£2,551	£0	£0	£2,551
26	XSO Assembly	£23,040	£20,405	£2,635	£0	£23,040
27	XSO Review	£8,640	£7,652	£988	£0	£8,640
28	**Intg'tn & Proving Pha**	**£25,920**	**£22,955**	**£2,965**	**£0**	**£25,920**



Gantt Chart

Period 5 (17-20): S-C charged £5k/wk not the baseline £3k for LensFab: Their EV system reports BCWP = 6k. ISD re-run completed wk 18. Fab'rtn resource on ISFab raised to 2 from start of wk 19 to speed it up. SG-2 (50% Milestone) was passed at second attempt on Friday week 20. FMP and EFab proceeded to plan

Case-Study-6: Status Report Period-6 (Wks21-24)

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- Status
  - LensFab continuing to cost £5k/wk: S-C's EV system reports £14.1k BCWP

4	Period Cost	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
LensFab	Cumulative Cost	3000	6000	9000	12000	15000	18000	21000	24000	27000	30000
	% Complete	(10%)	(20%)	(30%)	(40%)	(50%)	(60%)	(70%)	(80%)	(90%)	(100%)

    - Sub-con report they expect to conclude in week 32
    - Subsequent work assigned to the S-C (Laser Positioning Controls Fabrication (LPCFab)) will therefore be delayed due to resource constraints
    - Subsequent Tech-I work on OA no longer spans weeks 29 and 30 however XA does now fall across wks 29 & 30
    - Despite doubled resources ISFab only passed SG-3 (80% EV) Friday week 23 and is now expected to finish wk 25 with 2 full-time Fab'rtn Dept staff assigned
- Tracking: First set Status Date (EG 15/6/01)
  - Tech-I and SC over-allocations now need to be addressed
  - Try to do tracking before looking at following slides

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Case-Study: Tracking Period-6 (Wks21-24):

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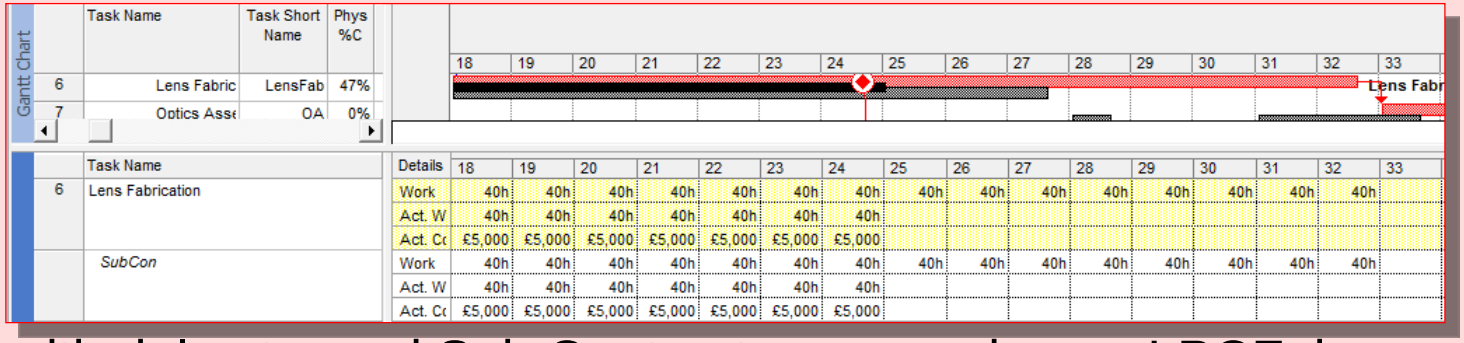
- Tracking LensFab
  - Update as scheduled if you amended rate to £5k/wk otherwise track 4wks at 66.67 hrs
    - Ensure LensFab Phys%C and P%C reflect 14.1k of task-BAC
    - Extend S-C's assignment to week 32



- Deal with delay to, and Sub Contractor resourcing on LPCFab
  - Hint-1 *Split screen Gantt and Resource Graph* & *Filter tasks*
  - Hint-2 LPCFab already has 105d Levelling Delay from initial levelling
  - Try making corrections before looking at next slide

Case-Study: Period-6 S-C Issues

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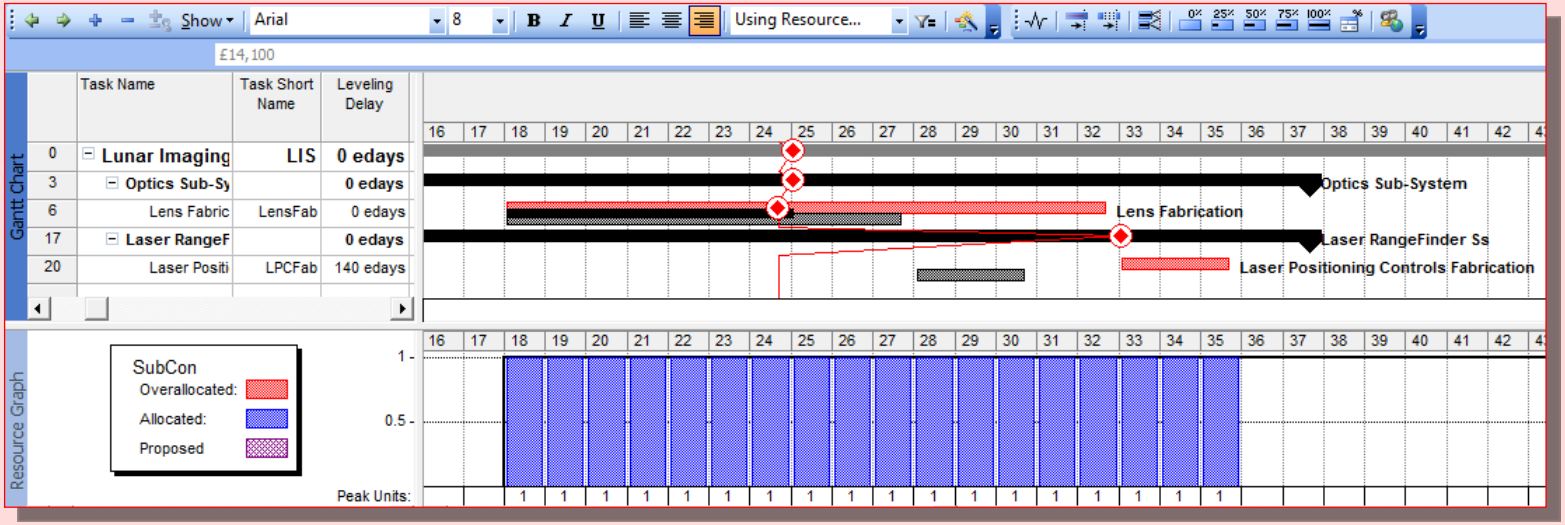
- Dealing with the Sub contractor's over-allocation on LPCFab
  - The LPCFab task could be given 5 weeks extra *Levelling Delay* now 140 days



- Alternatively
  - The S-C's assignment to LPCFab can be delayed by 25 days
  - (Or a 'dependency' could be added between the two tasks)

Case-Study: Period 6 Tech-I Allocation

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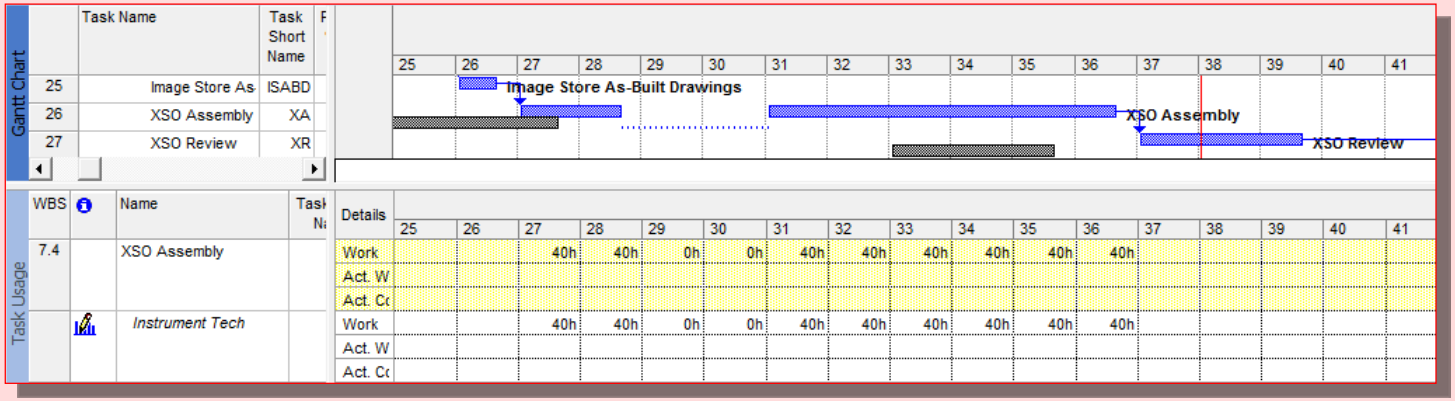
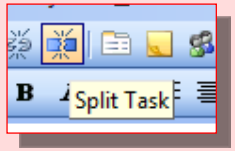
- Subsequent Tech-I work on OA no longer spans weeks 29 and 30 however XA does now fall across wks 29 & 30



  - Edit the resource assignment or use the Split-task button and split-task cursor



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Case-Study: Period-6 Tech-I Allocation Alternate Layout

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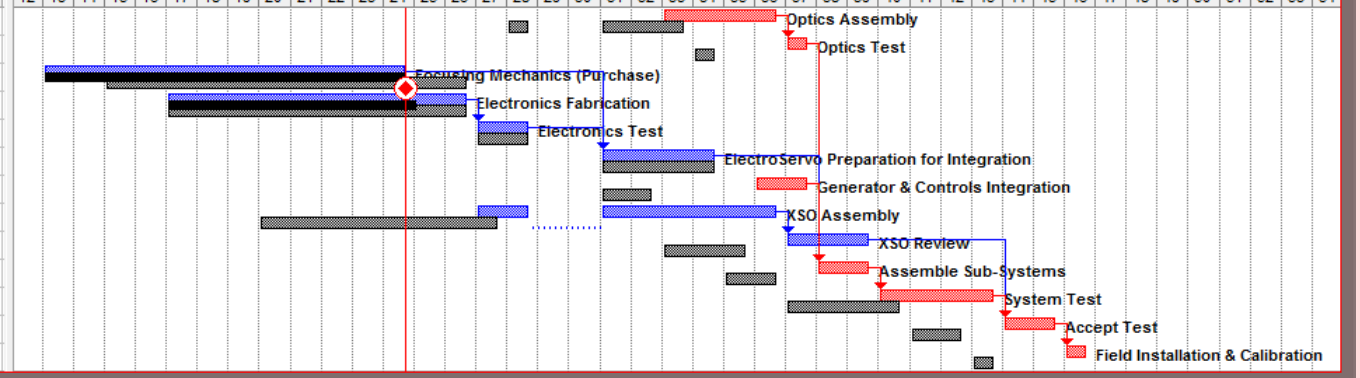
- An alternate view layout to see and manage overallocations
  - Tech-I Scheduled to XA now ‘working’ wks 29 & 30
  - OA no longer requires split

Resource Sheet

	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1	Optical Eng.	Work		m		4	£3,363/wk	£0/hr	£0	Prorated	Standard	
2	Drawing Office	Work		d		2	£2,551/wk	£0/hr	£0	Prorated	Standard	
3	SubCon	Work		s		1	£5,000/wk	£0/hr	£0	Prorated	Standard	
4	Instrument Tech	Work		i		3	£2,880/wk	£0/hr	£0	Prorated	Standard	
5	Electrical Eng.	Work		e		1	£3,363/wk	£0/hr	£0	Prorated	Standard	
6	Fabr'tn Dept	Work		s		1	£3,363/wk	£0/hr	£0	Prorated	Standard	

Gantt Chart

	Task Name	Task Short Name
7	Optics Assembly	OA
8	Optics Test	OT
11	Focusing Mechanics (Pur	FMP
14	Electronics Fabrication	EFab
15	Electronics Test	ET
16	ElectroServo Preparation	ESI
21	Generator & Controls Inte	LGCI
26	XSO Assembly	XA
27	XSO Review	XR
29	Assemble Sub-Systems	ASS
30	System Test	LISST
31	Accept Test	LISAT
32	Field Installation & Calibrat	FIC



- Drag a split or switch bottom pane to Task Usage to make edits

Case-Study: Period 6 ISFab

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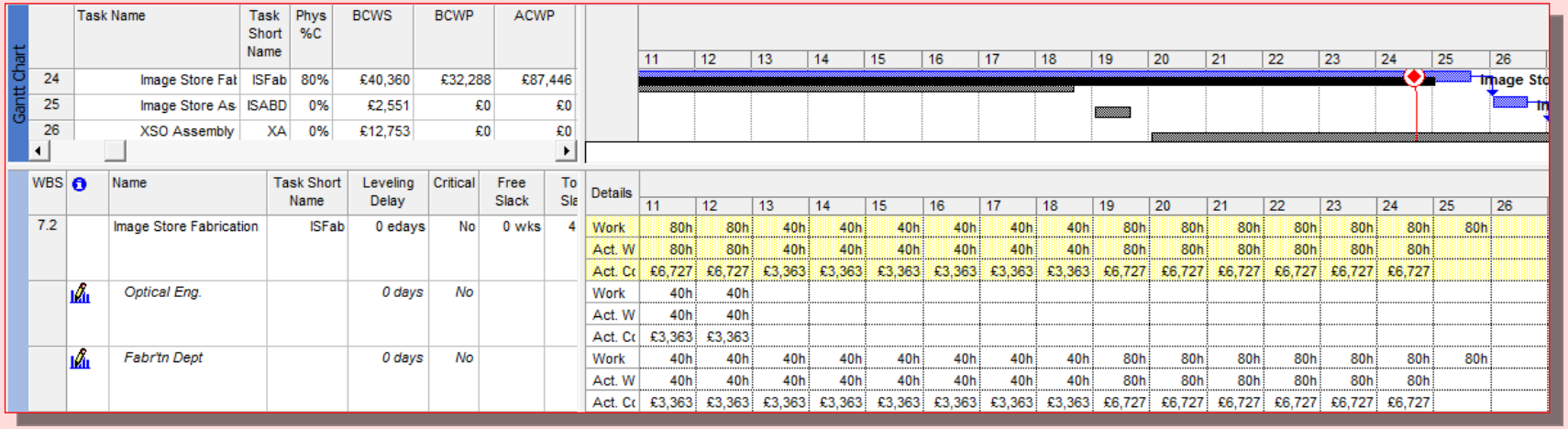
- Despite doubled resources ISFab only passed SG-3 (80% EV) Friday week 23 and is now expected to finish wk 25 with 2 full-time Fab'rtn Dept staff assigned
  - NOTE: Additional Fab'rtn resource ∴ 80hrs charged / Wk
- Set ISFab Phys %C to 80%



Gantt Chart

	Task Name	Task Short Name	Phys %C	BCWS	BCWP	ACWP
24	Image Store Fat	ISFab	80%	£40,360	£32,288	£87,446
25	Image Store As	ISABD	0%	£2,551	£0	£0
26	XSO Assembly	XA	0%	£12,753	£0	£0

WBS	Name	Task Short Name	Leveling Delay	Critical	Free Slack	To Sla	Details	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
7.2	Image Store Fabrication	ISFab	0 edays	No	0 wks	4	Work	80h	80h	40h	40h	40h	40h	40h	40h	80h	80h	80h	80h	80h	80h	80h	
							Act. W	80h	80h	40h	40h	40h	40h	40h	40h	80h	80h	80h	80h	80h	80h		
							Act. Cc	£6,727	£6,727	£3,363	£3,363	£3,363	£3,363	£3,363	£3,363	£6,727	£6,727	£6,727	£6,727	£6,727	£6,727		
	Optical Eng.		*0 days*	*No*			Work	40h	40h														
							Act. W	40h	40h														
							Act. Cc	£3,363	£3,363														
	Fabr'tn Dept		*0 days*	*No*			Work	40h	40h	40h	40h	40h	40h	40h	40h	80h	80h	80h	80h	80h	80h	80h	
							Act. W	40h	40h	40h	40h	40h	40h	40h	40h	80h	80h	80h	80h	80h	80h		
							Act. Cc	£3,363	£3,363	£3,363	£3,363	£3,363	£3,363	£3,363	£3,363	£6,727	£6,727	£6,727	£6,727	£6,727	£6,727		

- FMP and EFab progressed as 'now planned'

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Case-Study: Period-6 Schedule Summary

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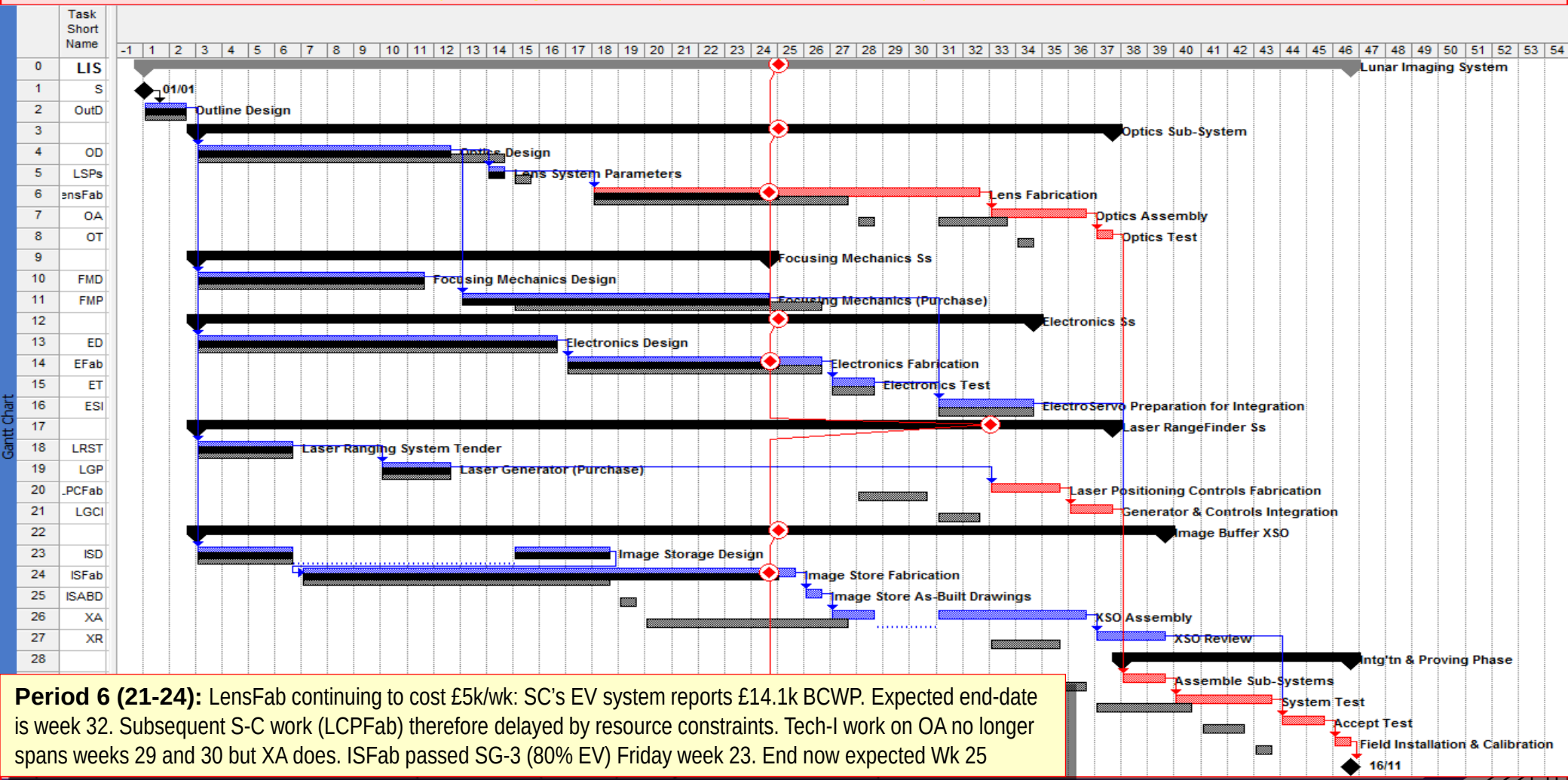

Period 6 (21-24): LensFab continuing to cost £5k/wk: SC's EV system reports £14.1k BCWP. Expected end-date is week 32. Subsequent S-C work (LCPFab) therefore delayed by resource constraints. Tech-I work on OA no longer spans weeks 29 and 30 but XA does. ISFab passed SG-3 (80% EV) Friday week 23. End now expected Wk 25

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Case-Study: Period-6 EV Summary

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Gantt Chart

	Task Sh Name	Phys %	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC-cpi	BAC	VAC	TCPI	VAC
0	**LIS**	**0%**	**£295,365**	**£270,191**	**£361,301**	**-£25,174**	**-8%**	**0.91**	**-£91,111**	**-33%**	**0.75**	**£528,176**	**£394,984**	**-£133,192**	**3.7**	**-£133,192**
2	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	1	£9,277	£9,277	£0	1	£0
3		**0%**	**£66,573**	**£59,673**	**£73,847**	**-£6,900**	**-10%**	**0.9**	**-£14,173**	**-23%**	**0.81**	**£109,305**	**£88,326**	**-£20,979**	**1.98**	**-£20,979**
4	OD	100%	£42,210	£42,210	£35,483	£0	0%	1	£6,727	15%	1.19	£35,483	£42,210	£6,727	0	£6,727
5	LSPs	100%	£3,363	£3,363	£3,363	£0	0%	1	£0	0%	1	£3,363	£3,363	£0	1	£0
6	ensFab	47%	£21,000	£14,100	£35,000	-£6,900	-32%	0.67	-£20,900	-148%	0.4	£74,468	£30,000	-£44,468	-3.18	-£44,468
9		**0%**	**£56,701**	**£61,802**	**£65,755**	**£5,101**	**8%**	**1.09**	**-£3,953**	**-6%**	**0.94**	**£65,755**	**£61,802**	**-£3,953**	**0**	**-£3,953**
10	FMD	100%	£31,195	£31,195	£31,195	£0	0%	1	£0	0%	1	£31,195	£31,195	£0	1	£0
11	FMP	0%	£25,506	£30,607	£34,560	£5,101	20%	1.2	-£3,953	-12%	0.89	£34,560	£30,607	-£3,953	0	-£3,953
12		**0%**	**£68,416**	**£68,416**	**£71,051**	**£0**	**0%**	**1**	**-£2,635**	**-3%**	**0.96**	**£92,242**	**£88,821**	**-£3,421**	**1.15**	**-£3,421**
13	ED	100%	£48,011	£48,011	£48,011	£0	0%	1	£0	0%	1	£48,011	£48,011	£0	1	£0
14	EFab	0%	£20,405	£20,405	£23,040	£0	0%	1	-£2,635	-12%	0.89	£28,800	£25,506	-£3,294	2.07	-£3,294
17		**0%**	**£23,543**	**£23,543**	**£23,543**	**£0**	**0%**	**1**	**£0**	**0%**	**1**	**£37,644**	**£37,644**	**£0**	**1**	**£0**
18	LRST	100%	£13,453	£13,453	£13,453	£0	0%	1	£0	0%	1	£13,453	£13,453	£0	1	£0
19	LGP	100%	£10,090	£10,090	£10,090	£0	0%	1	£0	0%	1	£10,090	£10,090	£0	1	£0
22		**0%**	**£70,854**	**£47,479**	**£117,828**	**-£23,376**	**-32%**	**0.67**	**-£70,349**	**-148%**	**0.4**	**£213,818**	**£86,158**	**-£127,660**	**-1.22**	**-£127,660**
23	ISD	100%	£15,191	£15,191	£30,382	£0	0%	1	-£15,191	-100%	0.5	£30,382	£15,191	-£15,191	0	-£15,191
24	ISFab	80%	£40,360	£32,288	£87,446	-£8,072	-20%	0.8	-£55,158	-170%	0.37	£109,307	£40,360	-£68,948	-0.17	-£68,948
25	ISABD	0%	£2,551	£0	£0	-£2,551	-100%	0	£0	0%	0	£2,551	£2,551	£0	1	£0
26	XA	0%	£12,753	£0	£0	-£12,753	-100%	0	£0	0%	0	£23,040	£20,405	-£2,635	1	-£2,635

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Case-Study-7: Period-7 (Wks25-28) Status Report

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- Status
  - S-C site visit held. S-C showed that OD provided an inappropriate design
    - LensFab current status is BCWP = 22k (73.3% complete)
    - Delivery still scheduled for Friday Wk 32
    - Focus on LensFab & LCPFab resulted in EFab not being monitored closely enough and overran by 1 wk and resulted in…

    …ET now scheduled when Tech-I's are unavailable, worse! Yet…

    …ET is EV-Type 0-100 and split across reporting period
- Tracking: Set Status Date (EG 13/7/01)
  - Update OD 'to schedule', set Phys%C to 73% (£21,900)
    - OD can be set to %C for the actual 73.3% and remove incorrect £100 variance)
  - Track EFab into Wk27
  - Track ISFab, ISABD and XA 'to schedule'

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Case-Study: Period-7 Summary

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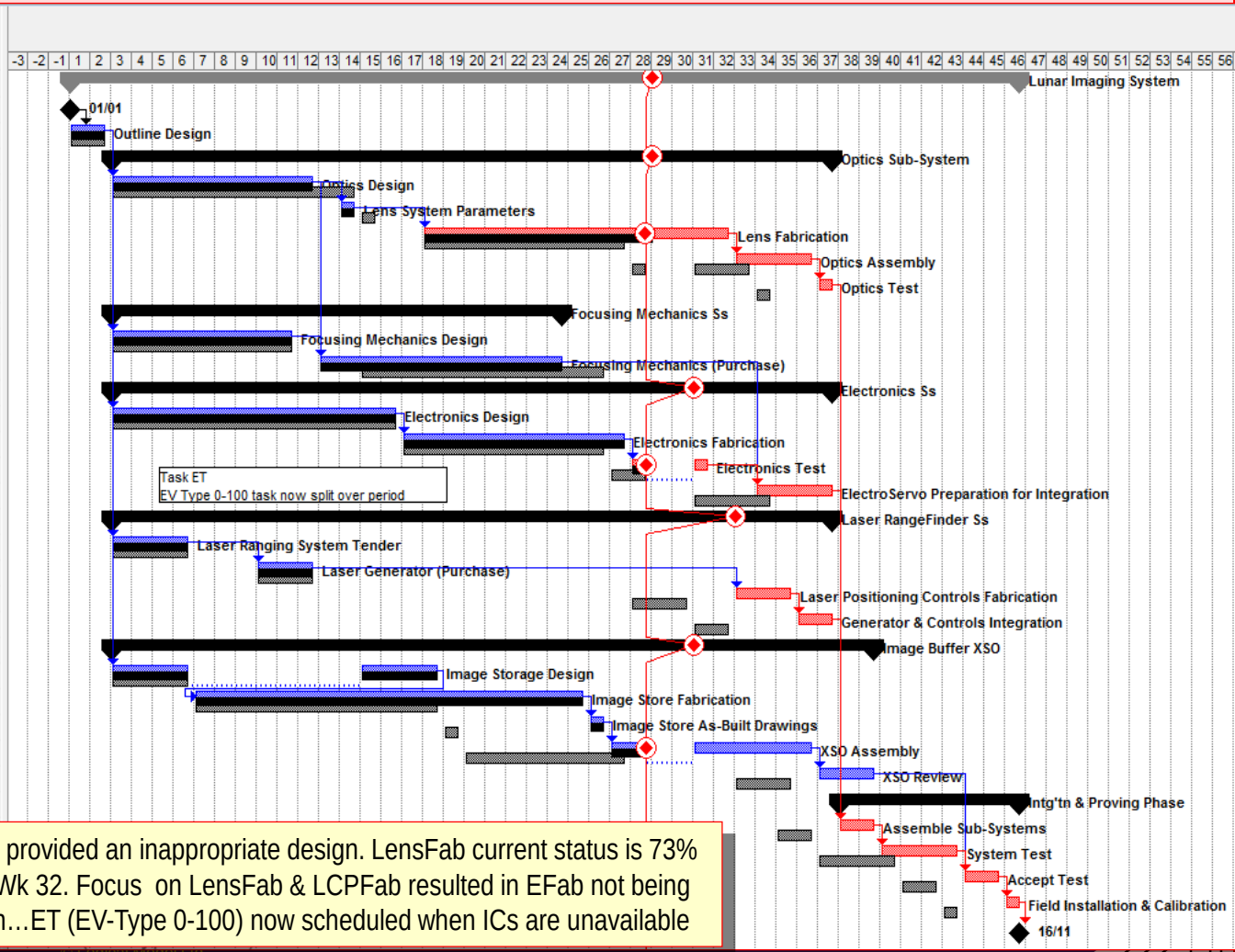
	Task Name	Short Name	Phys %C	BCWS	BCWP	ACWP
0	**Lunar Imaging System**	LIS	0%	£332,871	£298,916	£407,859
1	Start-MS	S	0%	£0	£0	£0
2	Outline Design	OutD	100%	£9,277	£9,277	£9,277
3	**Optics Sub-System**		0%	£78,124	£67,573	£93,847
4	Optics Design	OD	100%	£42,210	£42,210	£35,483
5	Lens System Parameters	LSPs	100%	£3,363	£3,363	£3,363
6	Lens Fabrication	nsFab	73%	£30,000	£22,000	£55,000
7	Optics Assembly	OA	0%	£2,551	£0	£0
8	Optics Test	OT	0%	£0	£0	£0
9	**Focusing Mechanics Ss**		0%	£61,802	£61,802	£65,755
10	Focusing Mechanics Design	FMD	100%	£31,195	£31,195	£31,195
11	Focusing Mechanics (Purchase)	FMP	0%	£30,607	£30,607	£34,560
12	**Electronics Ss**		0%	£78,619	£73,517	£82,571
13	Electronics Design	ED	100%	£48,011	£48,011	£48,011
14	Electronics Fabrication	EFab	0%	£25,506	£25,506	£31,680
15	Electronics Test	ET	0%	£5,101	£0	£2,880
16	ElectroServo Preparation for Integration	ESI	0%	£0	£0	£0
17	**Laser RangeFinder Ss**		0%	£26,543	£23,543	£23,543
18	Laser Ranging System Tender	LRST	0%	£13,453	£13,453	£13,453
19	Laser Generator (Purchase)	LGP	100%	£10,090	£10,090	£10,090
20	Laser Positioning Controls Fabrication	PCFab	0%	£3,000	£0	£0
21	Generator & Controls Integration	LGCI	0%	£0	£0	£0
22	**Image Buffer XSO**		0%	£78,506	£63,203	£132,865
23	Image Storage Design	ISD	100%	£15,191	£15,191	£30,382
24	Image Store Fabrication	ISFab	100%	£40,360	£40,360	£94,172
25	Image Store As-Built Drawings	SABD	100%	£2,551	£2,551	£2,551
26	XSO Assembly	XA	0%	£20,405	£5,101	£5,760
27	XSO Review	XR	0%	£0	£0	£0
28	**Intg'tn & Proving Phase**		0%	£0	£0	£0



Period 7 (25-28): S-C site visit held. S-C showed that OD provided an inappropriate design. LensFab current status is 73% complete (BCWP = 21.9k), Delivery still scheduled for Friday Wk 32. Focus on LensFab & LCPFab resulted in EFab not being monitored closely enough and overran by 1 wk and resulted in…ET (EV-Type 0-100) now scheduled when ICs are unavailable

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Case-Study: Period-7 MSPJ EV Full Figures

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Earned Value Method	Task Name	Short Name	Phys %C	BCWS	BCWP	ACWP	SV	SV%	SPI	CV	CV%	CPI	EAC-cpi	BAC	VAC	TCPI	VAC
% Complete	**Lunar Imaging System**	**LIS**	**0%**	**£332,871**	**£298,816**	**£407,859**	**-£34,055**	**-10%**	**0.9**	**-£109,043**	**-36%**	**0.73**	**£539,121**	**£394,984**	**-£144,137**	**7.47**	**-£144,137**
% Complete	Start-MS	S	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£0	£0	£0	0	£0
Physical % Complete	Outline Design	OutD	100%	£9,277	£9,277	£9,277	£0	0%	1	£0	0%	1	£9,277	£9,277	£0	1	£0
% Complete	**Optics Sub-System**		**0%**	**£78,124**	**£67,473**	**£93,847**	**-£10,651**	**-13%**	**0.86**	**-£26,373**	**-39%**	**0.72**	**£122,851**	**£88,326**	**-£34,524**	**-3.78**	**-£34,524**
Physical % Complete	Optics Design	OD	100%	£42,210	£42,210	£35,483	£0	0%	1	£6,727	15%	1.19	£35,483	£42,210	£6,727	0	£6,727
Physical % Complete	Lens System Parameters	LSPs	100%	£3,363	£3,363	£3,363	£0	0%	1	£0	0%	1	£3,363	£3,363	£0	1	£0
Physical % Complete	Lens Fabrication	ɴsFab	73%	£30,000	£21,900	£55,000	-£8,100	-27%	0.73	-£33,100	-151%	0.4	£75,343	£30,000	-£45,343	-0.32	-£45,343
% Complete	Optics Assembly	OA	0%	£2,551	£0	£0	-£2,551	-100%	0	£0	0%	0	£11,520	£10,202	-£1,318	1	-£1,318
Physical % Complete	Optics Test	OT	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£2,880	£2,551	-£329	1	-£329
% Complete	**Focusing Mechanics Ss**		**0%**	**£61,802**	**£61,802**	**£65,755**	**£0**	**0%**	**1**	**-£3,953**	**-6%**	**0.94**	**£65,755**	**£61,802**	**-£3,953**	**0**	**-£3,953**
Physical % Complete	Focusing Mechanics Design	FMD	100%	£31,195	£31,195	£31,195	£0	0%	1	£0	0%	1	£31,195	£31,195	£0	1	£0
% Complete	Focusing Mechanics (Purchase)	FMP	0%	£30,607	£30,607	£34,560	£0	0%	1	-£3,953	-12%	0.89	£34,560	£30,607	-£3,953	0	-£3,953
% Complete	**Electronics Ss**		**0%**	**£78,619**	**£73,517**	**£82,571**	**-£5,101**	**-6%**	**0.94**	**-£9,054**	**-12%**	**0.89**	**£99,760**	**£88,821**	**-£10,939**	**2.45**	**-£10,939**
Physical % Complete	Electronics Design	ED	100%	£48,011	£48,011	£48,011	£0	0%	1	£0	0%	1	£48,011	£48,011	£0	1	£0
% Complete	Electronics Fabrication	EFab	0%	£25,506	£25,506	£31,680	£0	0%	1	-£6,174	-24%	0.81	£31,680	£25,506	-£6,174	0	-£6,174
Physical % Complete	Electronics Test	ET	0%	£5,101	£0	£2,880	-£5,101	-100%	0	-£2,880	0%	0	£5,760	£5,101	-£659	2.3	-£659
Physical % Complete	ElectroServo Preparation for Integration	ESI	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£11,520	£10,202	-£1,318	1	-£1,318
% Complete	**Laser RangeFinder Ss**		**0%**	**£26,543**	**£23,543**	**£23,543**	**-£3,000**	**-11%**	**0.89**	**£0**	**0%**	**1**	**£37,644**	**£37,644**	**£0**	**1**	**£0**
% Complete	Laser Ranging System Tender	LRST	0%	£13,453	£13,453	£13,453	£0	0%	1	£0	0%	1	£13,453	£13,453	£0	1	£0
Physical % Complete	Laser Generator (Purchase)	LGP	100%	£10,090	£10,090	£10,090	£0	0%	1	£0	0%	1	£10,090	£10,090	£0	1	£0
% Complete	Laser Positioning Controls Fabrication	ᵖCFab	0%	£3,000	£0	£0	-£3,000	-100%	0	£0	0%	0	£15,000	£9,000	-£6,000	1	-£6,000
Physical % Complete	Generator & Controls Integration	LGCI	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£5,760	£5,101	-£659	1	-£659
% Complete	**Image Buffer XSO**		**0%**	**£78,506**	**£63,203**	**£132,865**	**-£15,304**	**-19%**	**0.81**	**-£69,663**	**-110%**	**0.48**	**£181,122**	**£86,158**	**-£94,965**	**-0.49**	**-£94,965**
Physical % Complete	Image Storage Design	ISD	100%	£15,191	£15,191	£30,382	£0	0%	1	-£15,191	-100%	0.5	£30,382	£15,191	-£15,191	0	-£15,191
Physical % Complete	Image Store Fabrication	ISFab	100%	£40,360	£40,360	£94,172	£0	0%	1	-£53,813	-133%	0.43	£94,172	£40,360	-£53,813	0	-£53,813
% Complete	Image Store As-Built Drawings	SABD	100%	£2,551	£2,551	£2,551	£0	0%	1	£0	0%	1	£2,551	£2,551	£0	1	£0
% Complete	XSO Assembly	XA	0%	£20,405	£5,101	£5,760	-£15,304	-75%	0.25	-£659	-12%	0.89	£23,040	£20,405	-£2,635	1.04	-£2,635
% Complete	XSO Review	XR	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£8,640	£7,652	-£988	1	-£988
% Complete	**Intg'tn & Proving Phase**		**0%**	**£0**	**£0**	**£0**	**£0**	**0%**	**0**	**£0**	**0%**	**0**	**£25,920**	**£22,955**	**-£2,965**	**1**	**-£2,965**
Physical % Complete	Assemble Sub-Systems	ASS	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£5,760	£5,101	-£659	1	-£659
% Complete	System Test	LISST	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£11,520	£10,202	-£1,318	1	-£1,318
Physical % Complete	Accept Test	LISAT	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£5,760	£5,101	-£659	1	-£659
Physical % Complete	Field Installation & Calibration	FIC	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£2,880	£2,551	-£329	1	-£329
% Complete	Finish-MS	F	0%	£0	£0	£0	£0	0%	0	£0	0%	0	£0	£0	£0	0	£0

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Case-Study: EV Headlines To Period 7

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- Project figures as calculated in a spreadsheet
  - Some rounding discrepancies and MSPJ's treatment of P%C

Period	1	2	3	4	5	6	7
Weeks	1-4	5-8	9-12	13-16	17-20	21-24	25-28
BCWS	42,910	105,188	170,128	211,525	252,758	295,365	332,871
ACWP	42,910	110,289	175,229	224,671	291,355	361,301	407,859
BCWP	43,779	115,993	161,103	181,452	229,578	270,201	298,916
BAC	394,984	394,984	394,984	394,984	394,984	394,984	394,984
CV	869	5,704	- 14,126	- 42,560	- 62,046	- 92,407	- 108,943
SV	869	10,805	- 9,025	- 35,175	- 29,208	- 32,231	- 33,955
CV%	2%	5%	-9%	-24%	-28%	-35%	-36%
SV%	2%	10%	-5%	-17%	-12%	-11%	-10%
CPI CUM	1.02	1.05	0.92	0.81	0.78	0.74	0.73
SPI CUM	1.02	1.10	0.95	0.83	0.88	0.89	0.90
CPI CUR	1.02	1.07	0.69	0.35	0.71	0.57	0.68
SPI CUR	1.02	1.16	0.69	0.37	1.14	0.93	0.95
TCPI	100%	98%	106%	125%	160%	370%	Not Possible
EAC CPI	387,144	375,561	429,617	490,309	504,611	533,694	538,940
EAC CS	380,312	350,850	443,868	544,441	533,227	555,515	553,831

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Achieving return on investment requires Governance, Project planning, Tracking and escalated/ delegated decision making

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- Consultancy & training in
  - Basic structured project management
  - Tools and techniques for advanced project & programme management
  - Leading complex projects
  - Recovery of struggling projects
  - Creating & running PMOs
  - Project Risk and Quality Management
  - Using Earned Value Analysis
  - Board briefings on project control & governance

- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes

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- Lesson 9

Lesson 9: Topics We Haven't Covered

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What We Have Not Covered 1/3

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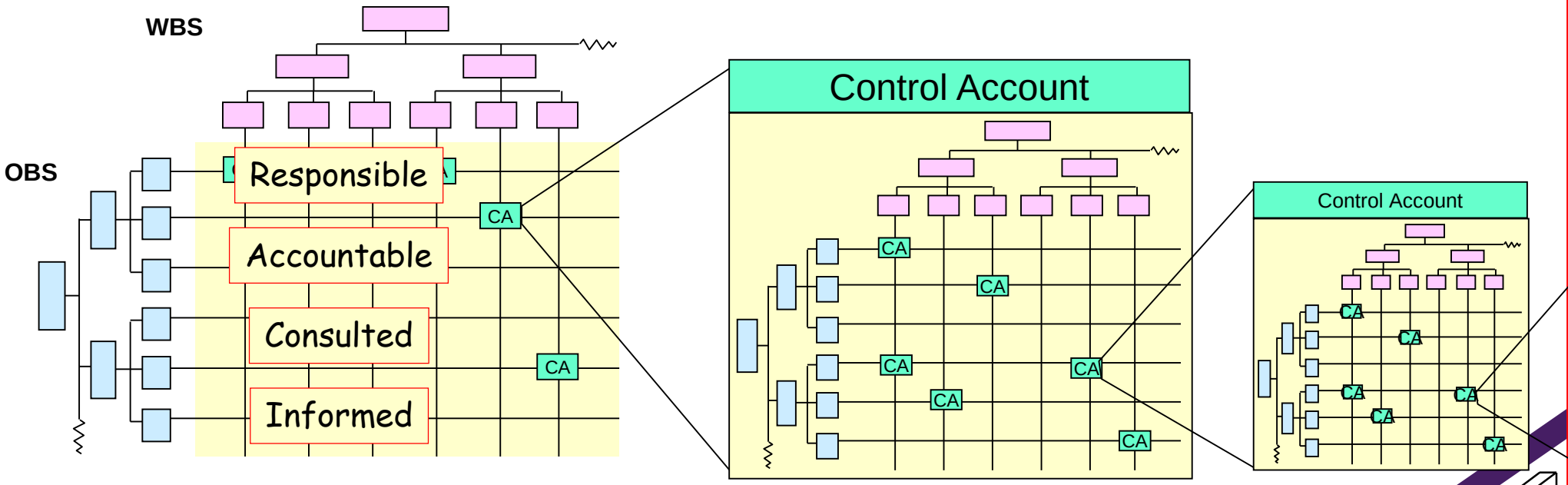
- Grouped projects
  - Master projects with included, hierarchical subprojects
  - Portfolios of (consolidated) projects



What We Have Not Covered 2/3

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- External dependency links
  - A link that include the task's filename

- Moving and copying information between projects
  - Mostly Copy, Cut and Paste work as expected
  - Assignments are based on an internal ID not Names so care is needed, selecting tasks takes assignment details
  - Views, Macros, base calendars (and more) can be copied with the organiser (a good way to restore heavily tailored views!)

Not Covered Continued! 3/3

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- Using Outlook to eMail task assignments and timesheets
  - And create resource pools
- Touched on Linking and Importing between MSPJ and other applications
  - Have not looked at Embedding, or exporting
- MSPJ Server
  - Resource pools, Timesheet admin, Executive decisions & Team comms
  - Portfolio analyser and modeller
- MSPJ Web Access
- Customised filters, groups, calculated fields, indicators
  - EG RAG indicators
- Changing toolbars and menus, writing macros and VBA Scripts
- Using project templates, accessing data via MS Access

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- Lesson 10

Lesson 10: Summary & Evaluation

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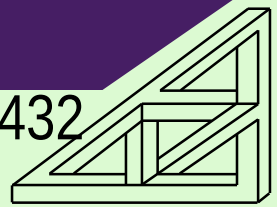

Where we Started: Course Objectives

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- Be able to
  - Link real-world PjM process to use of a typical planning tool
  - Create a project base-line in Microsoft® Project®
  - Track actual project progress against the base-line
  - Analyse and report project status
  - Amend project records to reflect intended responses

There are free sources of our value-add on our web-site www.logicalmodel.net

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- Consultancy & training in
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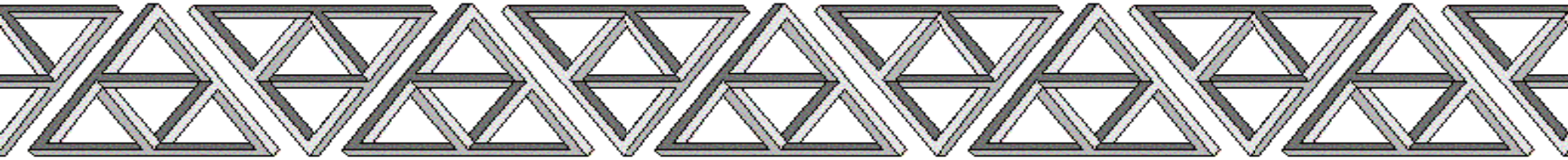
- Continued…
  - Dimension Four® Benefits Realisation Method training and consultancy
  - PRINCE2® Exam preparation & PRINCE2® use in the real-world
  - Implementing IT Governance using the CobiT® Framework
  - Implementing Benefits Realisation & Lessons Learned processes