

Differentiating between activities and work = Resource Optimization

Sebel and Citigate Albert Park, Melbourne
15 – 16 August 2012

WALK THE TALK

PMOZ
9TH ANNUAL PROJECT MANAGEMENT
AUSTRALIA CONFERENCE

Managing Partner PMGlobal
Sustaining World Class Portfolio, Program and
Project Management Conferences

Resource optimisation – a new paradigm for project scheduling

Patrick Weaver PMI-SP
PMOZ 2012

mosaic

Outline

- The cause of the problem
- The challenge
- Some existing & historical options
- A short term solution
- Suggestions for a long term solution

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

The cause of the problem

- **Around 50% of projects overrun time!!**
- Lack of skills, knowledge & qualifications
 - We have a problem!
- Legal / contractual paradigms
 - We have a bigger problem!!
- Sub-optimal tools and models?
 - The focus of this presentation

Resource Optimisation



The problem

- Our tools are based on very simplistic models
 - The focus is task, duration and sequence
 - The basic structure has not changed for 55 years
 - CPM was a gross simplification of the original ADM models
 - PDM was designed as a simplification of CPM
- FOR MANUAL ANALYSIS**

Resource Optimisation



Differentiating between activities and work = Resource Optimization

The problem

- Computers have improved 10,000 percent in the last 50 years
- Scheduling uses exactly the same simplistic models that were 'dumbed down' to work on computers in the early 1960s
- **Its time for a change!**

Resource Optimisation

mosaic

The challenge

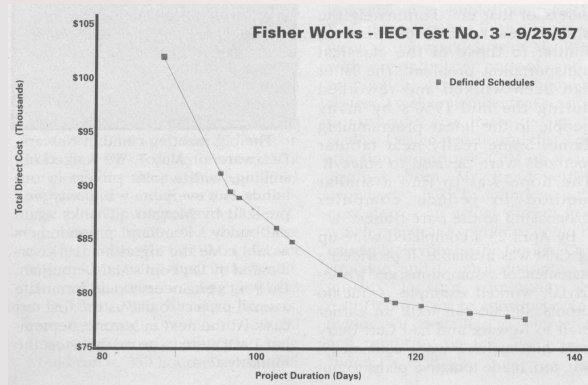
- Kelley & Walker set out to solve the 'time / cost conundrum'
- Where to best use scarce/expensive additional resources to shorten project durations
- Their focus was resource optimisation

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

The challenge



- Their 1957 model plotted time against the cost of the additional resources used

Resource Optimisation

mosaic

The challenge

- K&W mapped the cost and benefit of paying for 'crashed activity durations' against the overall time for the project
- But the analysis required many hours of computer time
- The estimate to run all Du Pont projects using the model was over 490 hours per month – **so the model was simplified!**

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

The current challenge

- Scheduling is supposed to focus on making the most efficient use of scarce resources to achieve the optimum project duration balancing time against the cost of the resources
 - Durations are a factor of the resources applied to the work and their efficiency
 - Only some sequences are mandatory, most should be based on resource efficiency

Resource Optimisation

mosaic

The current challenge

- Our scheduling tools:
 - Assume durations are a fact (unchangeable)
 - Assume all logic is a fact (unchangeable)
 - Focus on tasks, durations & float calculations
 - Delay activities if resources are not available
 - OR make incredibly simplistic assumptions about durations and effort (Brookes 1975)
 - Resource levelling is a one-pass deterministic calculation (based on rules)

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

The current challenge

- The focus is on the work (activities)
- But we want to make efficient use of the workers (resources)
- There are some partial solutions
 - Focus on work flow
 - Location based scheduling (derived from LoB)
 - Critical Chain
 - Resource optimisation based on activities
 - SPIDER (Russia)

Resource Optimisation

mosaic

A short term solution

Only plan in detail what you know in detail

- Schedule Levels & Schedule Density

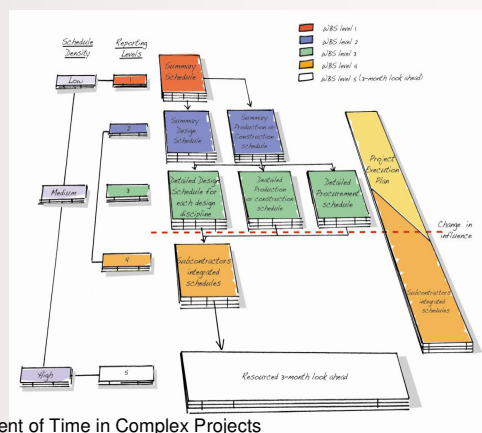


Figure © Guide to Good Practice in the Management of Time in Complex Projects

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

A short term solution

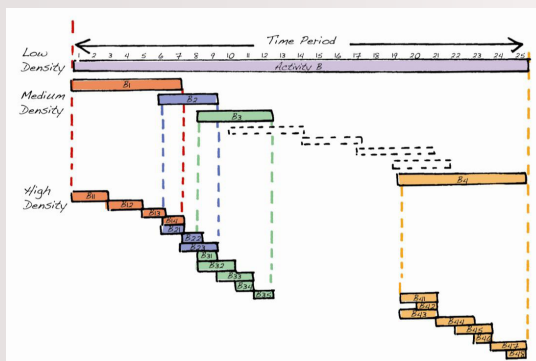
- Schedule Density
 - Overall framework is essential for Time Management..... But
 - Detail planning requires the people doing the work to be involved (eg, Last Planner)
 - Therefore, add detail when appropriate

Resource Optimisation

mosaic

Schedule Density

Figures © Guide to Good Practice in the Management of Time in Complex Projects



Activities are progressively expanded to greater levels of 'density' as more information becomes available

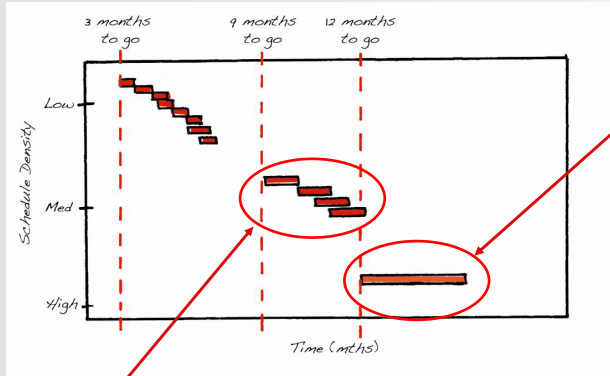
Unless the work is designed in its entirety and all subcontractors and specialists appointed before any work commences, it is impossible to plan the work in its entirety, in detail at the beginning of a project.

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

Schedule Density



Low-density is appropriate for work, which is intended to take place 12 months, or more in the future.

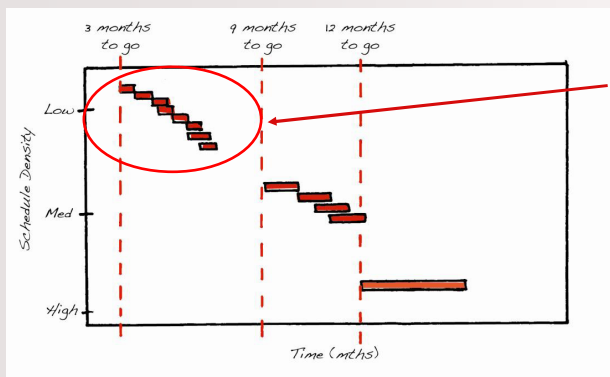
Tasks may be several months in duration

Medium density is appropriate for work, which is intended to take place between 3 and 9 months after the schedule date. At this stage the work should be designed in sufficient detail to be allocated to contractors, or subcontractors. Task durations should not exceed 2 months.

Resource Optimisation

mosaic

Schedule Density



High-density scheduling is an essential prerequisite for undertaking work. The schedule is prepared with the people doing the work.

Task durations should be no more than the update cycle

As the density is increased, adjustments to the plan take into account actual performance to date, resources, work content, and other factors necessary to achieve the overall schedule objectives.

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

A short term solution

- Schedule Density & Levels
 - Use Schedule Levels to keep individual files small and manageable
 - Low density schedule sets the overall ‘time budget’ objectives for the project (contract)
 - Medium density sets the strategy to deliver the objectives
 - Working with contractors and suppliers
 - Low density defines the short-term tactics to achieve the strategy

Resource Optimisation

mosaic

A short term solution

- As density increases, re-plan based on what you **know now** to:
 - Obtain future resources (medium density)
 - Make 100% effective use of the available resources (low density)
 - Achieve the overall ‘time budget’ objectives
- New forms of contract are being developed to achieve this solution

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

A long term solution

- Develop new software that:
 - Focuses on work flow and resources
 - The idea is not new!
 - Has constrained flexibility for durations based on resource allocations (not 'straight line')
 - Optimises resource allocation, usage and overall time (back to Kelly and Walker)
 - Actually helps planners manage time effectively (applies rules based 'intelligence')

Resource Optimisation



A long term solution

- **A few questions based on modern computing power**
- The focus of the questions is allowing the planner to set the parameters and then using the scheduling tool to suggest optimum solutions
- The planner retains ultimate control
- The tool helps the planner develop the optimum solution

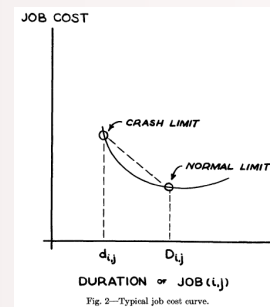
Resource Optimisation



Differentiating between activities and work = Resource Optimization

A long term solution

- **Q1:** Why can't durations be parametrized based on the work content and resource availability
 - Optimum time, preferred resources
 - Min time, max resources
 - Max time, min resources
 - Set based on work/resource type (with override options)
 - Weighted towards the optimum



Resource Optimisation

mosaic

A long term solution

- **Q2:** Why can't links be parametrized based on their purpose
 - Mandatory links that must be honoured
 - Work-flow links that are preferred
 - Alternative work-flow links to facilitate resource optimisation
 - Include max and min options on lags
 - Allow the tool to optimise the schedule within the rules

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

A long term solution

- **Q3:** Why can't the optimisation process be interactive
 - Computer assisted optimisation to integrate:
 - The planners 'common sense'
 - Rules built into the model
 - Computer power to run true optimisation
 - Allow review and override options to create a preferred model

Resource Optimisation

mosaic

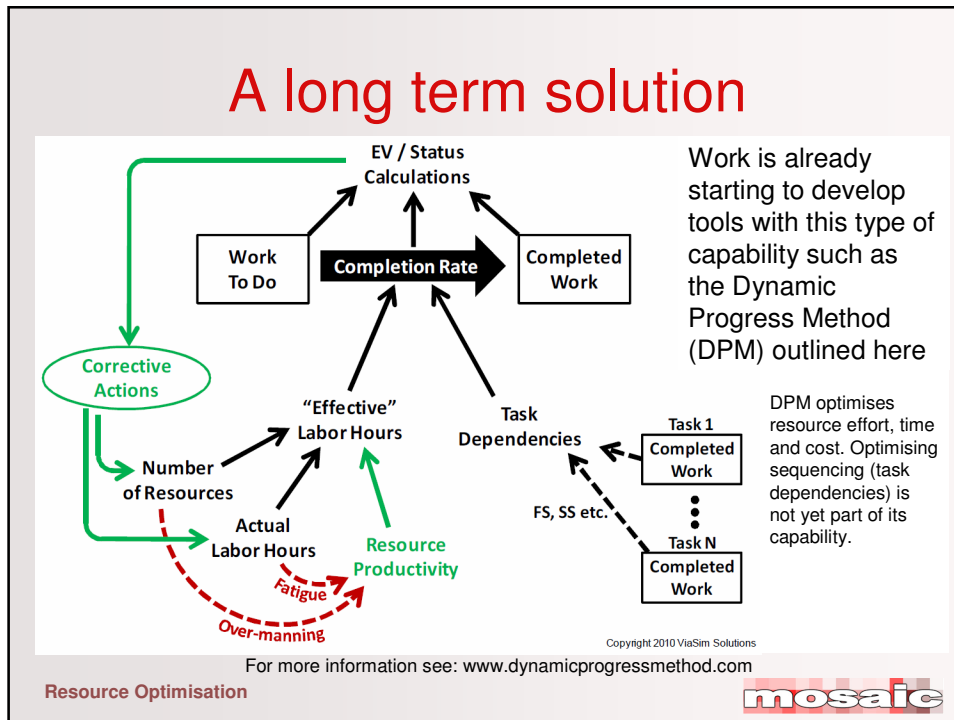
A long term solution

- The solutions exist:
 - We already have the computing power
 - We already have the basic optimisation algorithms
 - Tools are starting to be developed
 - Why can't these be applied routinely to planning and scheduling?

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization



A long term solution

- Linking to Schedule Density makes sense
 - Low Density schedules are time based objectives, this is the ‘contract program’
 - Medium Density schedules are time based with resource requirements aggregated/smoothed – the strategic intent / requirements
 - High Density schedules are resource optimised within the currently available resource availabilities

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization

Conclusions

If you always do what you've always done, you will always get what you've always got!

- As a profession, we need to do better!
- Schedules need to provide a process to make the optimum use of the project's workers (delay and disruption should be the same thing)

Resource Optimisation

mosaic

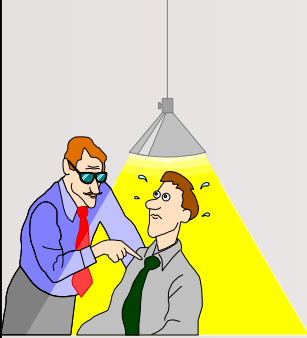
Conclusions

- We need tools that use 21st century capabilities
- We need trained and capable schedulers
- We need to ditch the critical path and focus on the critical work done by the critical workers

Resource Optimisation

mosaic

Differentiating between activities and work = Resource Optimization



Discussion

**Useful schedule are useful
because they are used!**

- Questions please
- Contact details:
 - Free planning and scheduling resources:
<http://www.mosaicprojects.com.au/Planning.html>
 - Email: patw@mosaicprojects.com.au

Resource Optimisation 