

Resource Levelling



Current CPM scheduling is failing to deliver successful project outcomes, in part because the automatic resource levelling systems in most tools, most of the time, produce sub-optimal results and changing a few settings in any of the tools can produce wildly different outcomes.

Projects achieve completion if the optimum use is made of the critical resources and the flow of

work is harmonised. This was the primary focus of Henry Gantt's work when he developed his famous 'Gantt Charts'¹ and it was also the mission of Kelley and Walker when they developed the original CPM system. For a number of reasons, these original endeavours were 'dumbed down' to the current focus on tasks, durations and logic. A resource optimised approach to scheduling; using the power of modern computers would focus on making the most efficient use of resources to achieve the optimum project completion date. Unfortunately, this is nearly impossible with our current set of scheduling tools.

There are two solutions to this problem, one is to move to a proper resource optimisation approach² the second is to adopt a more pragmatic approach to planning based on scheduling what you know.

Adopting a resource optimisation approach would involve changing the underlying philosophical approach embedded in CPM from a belief that the pre-determined duration and sequencing of activities takes precedence; to one that recognises the real objective of scheduling is to keep the resources working effectively and any activity sequencing represents a constraint on the locations where resources can work.

This change in approach would represent a totally new paradigm in the modern age, although as mentioned above, the original objective of CPM was resource optimisation! CPM was dumbed down to its current form to achieve realistic processing times on the computers available in the late 1950s; unfortunately almost no-one has moved on from these basic structures for a CPM model despite the massive advances in computer power.

A resource optimisation model would result in:

- Recognising that activities are variable. Any division of work into activities is arbitrary and can be changed.

¹ **Henry Gantt** was focused on the flow of resources through production facilities, see: <https://mosaicprojects.com.au/PMKI-ZSY-025.php>

² For a discussion on **resource optimization** see: https://mosaicprojects.com.au/PDF_Papers/P152_Resource_Optimisation_2.pdf

- Durations are a consequence of both the quantity and quality of resources actually assigned to the work. The relationship is complex (not simplistic resource driven durations) and capable of optimisation based on the project objectives.
- Resource workflows are the core determinant of project outcomes. Optimising resource workflows minimises cost and time outcomes. Sub-optimal or disrupted workflows increase cost and time outcomes.

An alternative and probably more realistically achievable approach in the short term, can be summarised as *'plan what you know and budget the rest'*. This is the approach adopted in the CIOB ***'Guide to good practice in the management of time in major projects'***³.

The Guide introduces the concept of Schedule Density⁴:

- Work more than 12 months in the future is planned at Low Density and defines the long-term strategic commitments of the project
- In the near term, work more than 3 months in the future is scheduled at Medium Density and defines the tactical approach to achieving the overall strategy set out in the Low Density schedule.
- Work in next three months is scheduled at High Density and defines in detail who will be doing what, where and when based on the resources actually available and their measured productivity.

The new paradigms proposed in this article are the focus of on-going work to formulate a practical set of proposals that may help make scheduling more useful and effective. However, to be effective a significant cultural change will be required that moves people's focus from 'the contract schedule' and the associated fighting over delay, disruption and extensions of time based on an arbitrary critical path; to a focus on delivering the contract on schedule based on the efficient use of resources! The technology is becoming available, what's lagging is the change in attitude needed to move beyond approaches limited by the technology of the 1950s.

³ For more on ***The Guide***, see: <https://mosaicprojects.com.au/shop-guide-to-good-practice.php>

⁴ For more on ***schedule density*** see: https://www.mosaicprojects.com.au/WhitePapers/WP1016_Schedule_Density.pdf





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