

Computers & Project Management CMI

Week 6: Topic: Management of Resource Data & Reporting

Overview: Your projects won't get executed or completed unless the necessary resources are available at the right cost, in the right timeframes, and with sufficient quality (of machinery, of systems, of professional services, parts, materials etc.). This week, we'll look at issues around entering, defining and managing resource pools, rates, calendars etc.

Objectives:

- To learn more about control of Resource Data in computer schedules
- To gain an understanding of "Output Reports" e.g.
 - Standard & Customized
 - Filtering
 - Sorting

Introduction

A few areas relating to project schedules are covered this week. Some more information regarding the management and control of resource data is provided, such as the use of aggregation and levelling.

Project management tools or applications are used for project communications, project control etc. and the production of reports is one of the most important functions of these applications. The importance of sensible filtering and sorting is covered.

Some common functions of project management applications allow for:

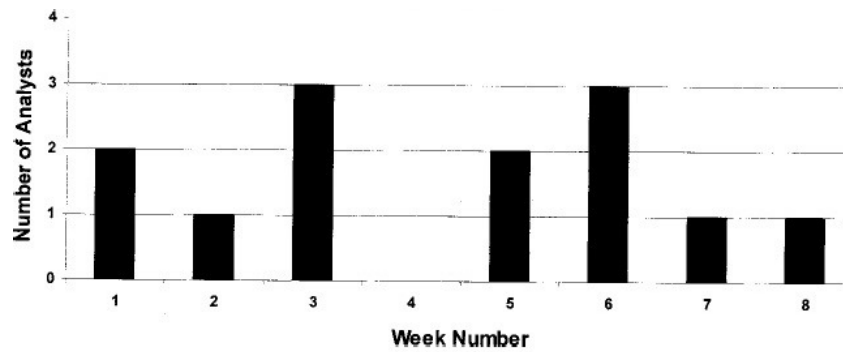
- Resource aggregation
- Resource levelling or scheduling

Resource Aggregation

Aggregation is the simplest of the automated scheduling methods available. As the title suggests, aggregation is little more than addition. The software simply schedules each activity at its earliest possible date, assigns the estimated number of resources for the period of the activity, and then repeats this for all other activities. No attempt is made to schedule activities at any time other than their earliest start.

As a result, aggregation is of relatively limited use in the project manager's tool-kit. It can produce schedules with a mix of resource overloads and with periods of under usage.

The PM software should allow the PM to view the resource aggregation for a schedule on a period-by-period basis, using a resource usage view or profile. This information is used to identify periods of peaks and troughs in resource requirements to allow the PM to plan accordingly and possibly look at smoothing out wide fluctuations.

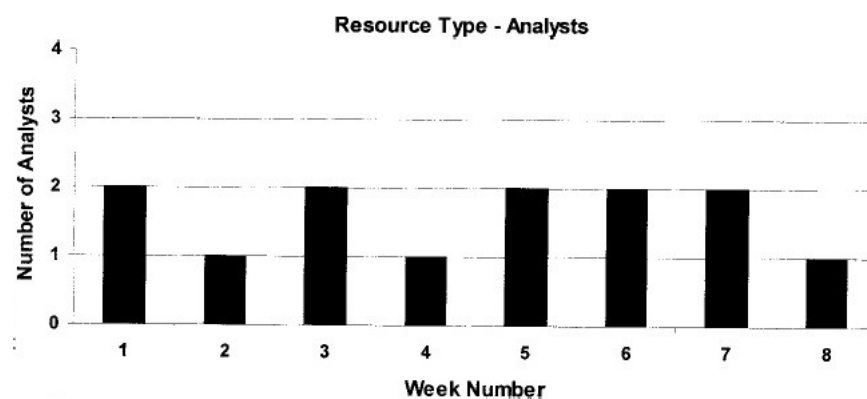


Example of Resource Aggregation chart.

Resource Levelling or Scheduling

Levelling, allows the Project Manager to ensure that resource availability and usage is optimised. Basically, resource levelling takes all the available resource data and re-allocates any extra or spare capacity found to other activities or tasks. This can result in significant savings e.g. you don't have resources on site without having work scheduled for them to perform. You may need to intervene manually to re-schedule any resources that have pre-set constraints e.g. must start or end on a particular date (you may need to bring in additional resources to resolve the constraint and thereby "level" the resources).

In order for resource levelling to be successful, the resource data provided needs to be accurate and relevant. For example, a software development project with 5 Java programmers with a similar skill set means that 5 Java programmers are practically interchangeable. When one of the 5 programmers has completed a task, an automated resource levelling function might re-assign that programmer to an outstanding task elsewhere. But if you have scarce or expensive resources on the project, you need to ensure that they are used in the most productive and cost-efficient way possible.



Example of Resource Aggregation chart after resource levelling.

In addition to the resource data, priority rules are required. Lock recommends the following be taken into account:

- Influence of float
- Time-limited scheduling
- Resource-limited scheduling

- You may also need to take quality issues into account i.e. in order to deliver the necessary quality, you may need additional resources, skills or to lengthen the time and / or phasing that some resources take to complete key tasks / activities.

All projects are subject to the relationship of the triple objectives – time, cost and quality. “Float” is often referred to as “slack” and basically means time available to move about.

The choice between time-limited scheduling and resource-limited scheduling is the classic project manager conundrum – not enough time so more people or use same number of people and take a little longer?

Limitations of Resource Levelling

The limitations to resource levelling are obvious, in particular for smaller projects. Most resource levelling functions will lead to peaks and troughs of activity where one particular resource type is assigned in one timeframe of activities. Using the example of the 5 Java programmers on a development project again, a resource levelling function may try to use all 5 programmers in concentrated bursts. This is fine technically but 4 of the programmers may be permanent employees with other duties and as a result of the resource scheduling, those 4 will only be shown available for 3 months out of a year. This is obviously not practical. Generally, the more people involved in a project the better a resource levelling function can work – simply because you can juggle people within the schedule to ensure you apply the right resources in the right quantities at the right time (i.e. minimise the constraints).

On smaller projects again, it is likely that the personal preferences of the project manager or project sponsor will be taken into account before task allocation is completed and this may lead to an element of forethought or experience allocating resources in a dynamic and optimised schedule – a) because they’ve done it before (maybe using a template from a previously successful project) b) because the project is small, it’s easy to predict exactly what resources will be needed and when.

A key thing to remember is that for resources that are “bought in” – you can schedule their availability but you can never guarantee it e.g. the plumber says he’ll be there on Monday but you find he’s away on holidays! That can impact on all your scheduling for other resources on tasks that come after the plumbers one.

“Work to List”

Resource levelling functions can generally provide a “Work to List” that provides an optimum sequence of tasks for the project team. Therefore, automated resource levelling is asking the question: “if you do it the way you’ve suggested, there are constraints – if you do it the way the computer systems suggests, there will be fewer constraints”. You then need to review the computer suggested schedule and see if it make sense in practical terms. You can often end up doing multiple iterations of resource levelling where you run levelling, adjust the schedule, re-run levelling, re-adjust the schedule etc.

Output Reports

There are two categories of output reports used in project management: **standard** and **customised** reports. All project management applications or tools offer standard reports. This also applies for MS Office applications, in particular summary sheets in Excel. Generally again, reports can be customised to suit the needs of the user. While most standard reports

will meet the needs of the Project Manager the software should allow users to generate custom reports based on any data field available in the program. This flexibility allows PMs to generate useful and relevant reports to suit their particular audience and reporting needs.

Reports do not have to be produced in hard copy and often take the form of “dashboards” or similar screens that portray the detail required. Many of the reports produced by project management applications do not suit print-outs (they may be too large) and tend to be used for internal, project team reporting & information.

Try printing a Gantt Chart from *MS Project* with a few hundred activities. It will run to several pages. It is vital to take the print output into account before handing a report over as it can create a bad impression of the project. Lock recommends ‘filtering’ and ‘sorting’ to solve this type of problem.

Filtering

‘Know your audience’ or in this case ‘your readership’. Filtering is basically editing reports or excluding unnecessary information – sometimes by summarising it - to include what the intended recipient wants or needs to see. Very few project stakeholders will be impressed by sheer bulk of unfiltered reports. Most high-level execs and sponsors are interested in e.g.:

- Are we on budget
- Are we on time
- Is product quality OK
- Any Risks likely to cause problems (short, medium, long term risk horizon)
- Any issues currently causing problems
- Is the project team working OK – getting all the assistance and resources they need?
- Key problems encountered and key improvements in the PM process that can be applied

The following options should be considered when filtering:

- Assigning departmental or other report codes to all activity records – as mentioned in cost / accounting codes etc. in last week’s session, the department and / or cost code should be included in the activity records and the resource data allowing filtering by department or cost code etc.
- Specifying milestones or key activities – again a case of knowing what matters to the reader.
- Reporting on selected resources – some resources on the project may be under pressure due to other responsibilities or be of particular interest to the reader.
- Choosing some other activity parameters – dependent on activity data available.

Filtering allows the generation of ‘Work to Lists’ by department and even by Individual if necessary, which will be of particular interest to department managers.

It makes sense to exclude completed tasks or tasks or items that are deemed confidential or commercially sensitive.

Sorting

The order in which data is presented is also important. This is achieved by using sorting.

Ideally sorting in reports should be possible by date, activity id, resource id etc. This is possible in MS Excel for instance.

For example, a PM may want a report sorted by activity id to help with checking for data entry errors. Whereas a team lead may want to see activities for their team members sorted by scheduled start date.

Combined Cost & Resource Table

Lock recommends these tables as helpful as the cost and duration of each activity is clear in a sequence e.g. costs for a task, work-stream, milestone etc. There is a concept similar to a WBS called a CBS that shows how costs are attributed to the project.

| Date | Resource LA: Labourer | | | | Resource SK: Skilled | | | | Task | Cumulative |
|-----------|-----------------------|------|--------|--------|----------------------|------|--------|--------|------------------------|------------|
| | Available | Used | Unused | Cost £ | Available | Used | Unused | Cost £ | materials project cost | £ |
| 10 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 50 | 330 |
| 11 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | | 610 |
| 12 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 100 | 990 |
| 13 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 100 | 1 370 |
| 14 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 175 | 1 825 |
| 17 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 525 | 2 630 |
| 18 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 2 975 |
| 19 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 3 320 |
| 20 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 3 665 |
| 21 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 4 010 |
| 24 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 4 355 |
| 25 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 4 700 |
| 26 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 5 045 |
| 27 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 5 390 |
| 28 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 5 735 |
| 31 May 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 6 080 |
| 01 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 40 | 6 400 |
| 02 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | | 6 680 |
| 03 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | | 6 960 |
| 04 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 65 | 7 305 |
| 07 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 55 | 7 640 |
| 08 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 200 | 8 120 |
| 09 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 360 | 8 760 |
| 10 Jun 10 | 1 | 1 | | 120 | 1 | 1 | | 160 | 40 | 9 080 |

Example of Combined Cost and Resource table report.

Project Summary Reports

As the name suggests these generally amount to one-page reports giving a management overview. The RAG (Red-Amber-Green) status (or ‘traffic light’) is a helpful way of providing a quick-glance report for people.

Another acronym used is “BRAG” – which is the same concept as above, but planned activities are coded in BLUE – to indicate that all the advance planning needed has been complete (e.g. to 50% or 75% or whatever).

For programs a concise summary showing status for each project may be required.

Bibliography and Further Reading

- Project Management, 9th Edition – Denis Lock (Gower).
- Guide to the Project Management Body of Knowledge (PMBOK), 4th edition, PMI.
- Managing Successful Project with PRINCE2, OGC 2005.
- Brilliant Project Management – Barker & Cole (Prentice-Hall)

- Dynamic Scheduling with Microsoft Office Project 2007 by Rodolfo Ambriz (J.Ross/International Institute for Learning) ISBN: 978-1-932159-87-5
- <http://www.jrosspub.com/Engine/Shopping/catalog.asp?store=12&category=189&item=14093&itempage=1>

Websites

- www.prince-officialsite.com – PRINCE2 website
- www.pmi.org – Project Management Institute
- www.ipma.ch – International Project Management Association
- www.projectmanagment9.com – support materials for Lock
- <http://blogs.msdn.com/b/project/archive/2008/10/30/back-to-basics-understanding-resource-leveling.aspx> - MS Project resource levelling example
- https://courses.worldcampus.psu.edu/welcome/pmangt/samplecontent/520lesson08/lesson08_06.html - Resource aggregation sample
- <http://www.stickyminds.com/sitewide.asp?Function=edetail&ObjectType=COL&ObjectID=10365> - Mapping Agile PM to PMBOK

Student preparation (informal):

To prepare yourself for the class, try having a look on the Internet for some of the sample files (links) above. These are easily located using Google searches such as “Project Scheduling”; “Project Resource Allocation”; “Project Schedule Control”; “Project Schedule Reports” etc.