CSE4708: Software Project Management

Unit IV :

Resource Allocation & Monitoring the Control

Topic:

Resource Allocation

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Resource Allocation

Resource Allocation

- Resource allocation is the process of assigning and scheduling resources to project tasks.
- Resources are the life blood of project management.
- Resources are used to carry out the project, and are returned to their owners if not consumed by the project.

What are resources?

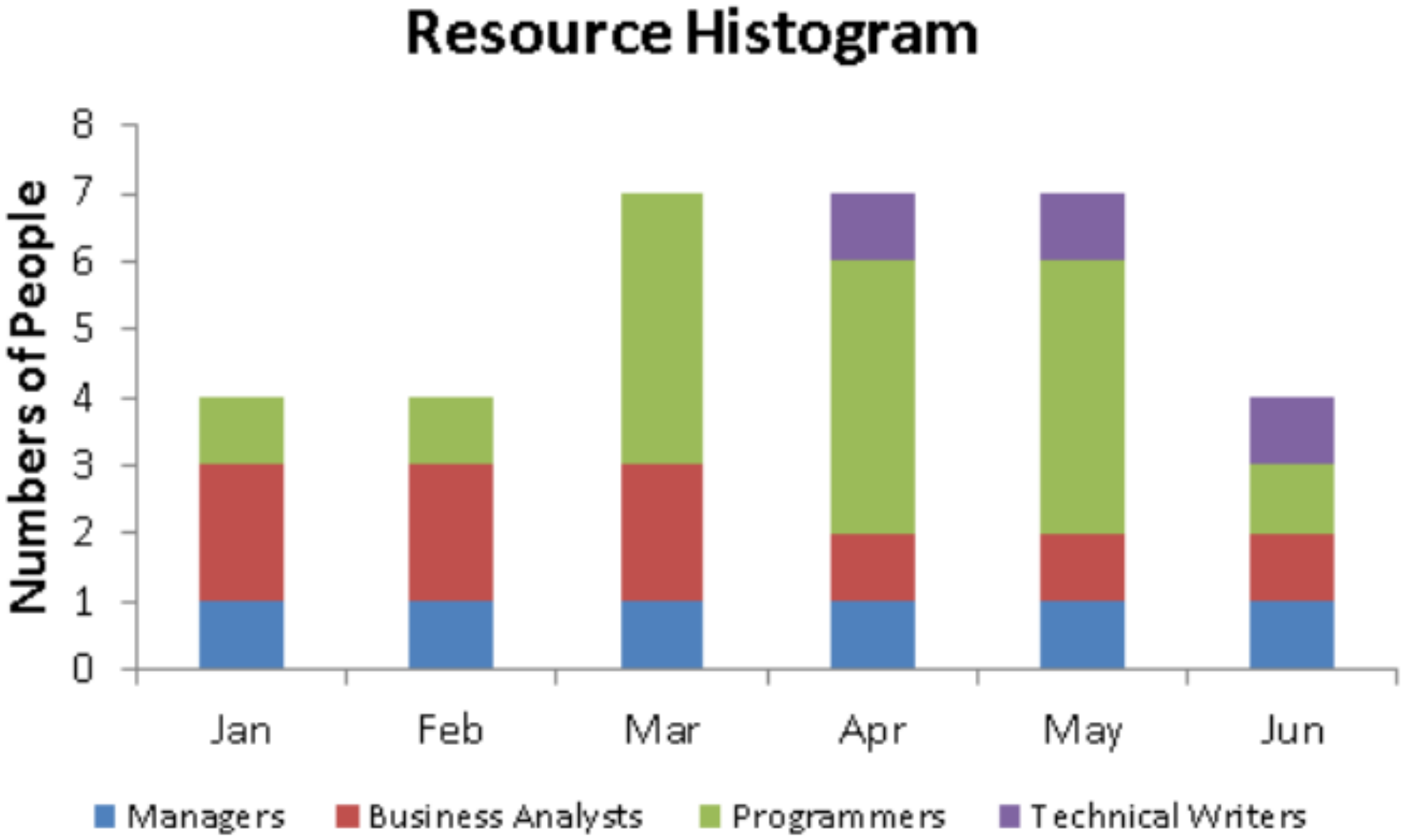
Anything used up to execute the project

- Budget
- People
- Technology
- Time
- Space
- Tools
- Equipment etc.

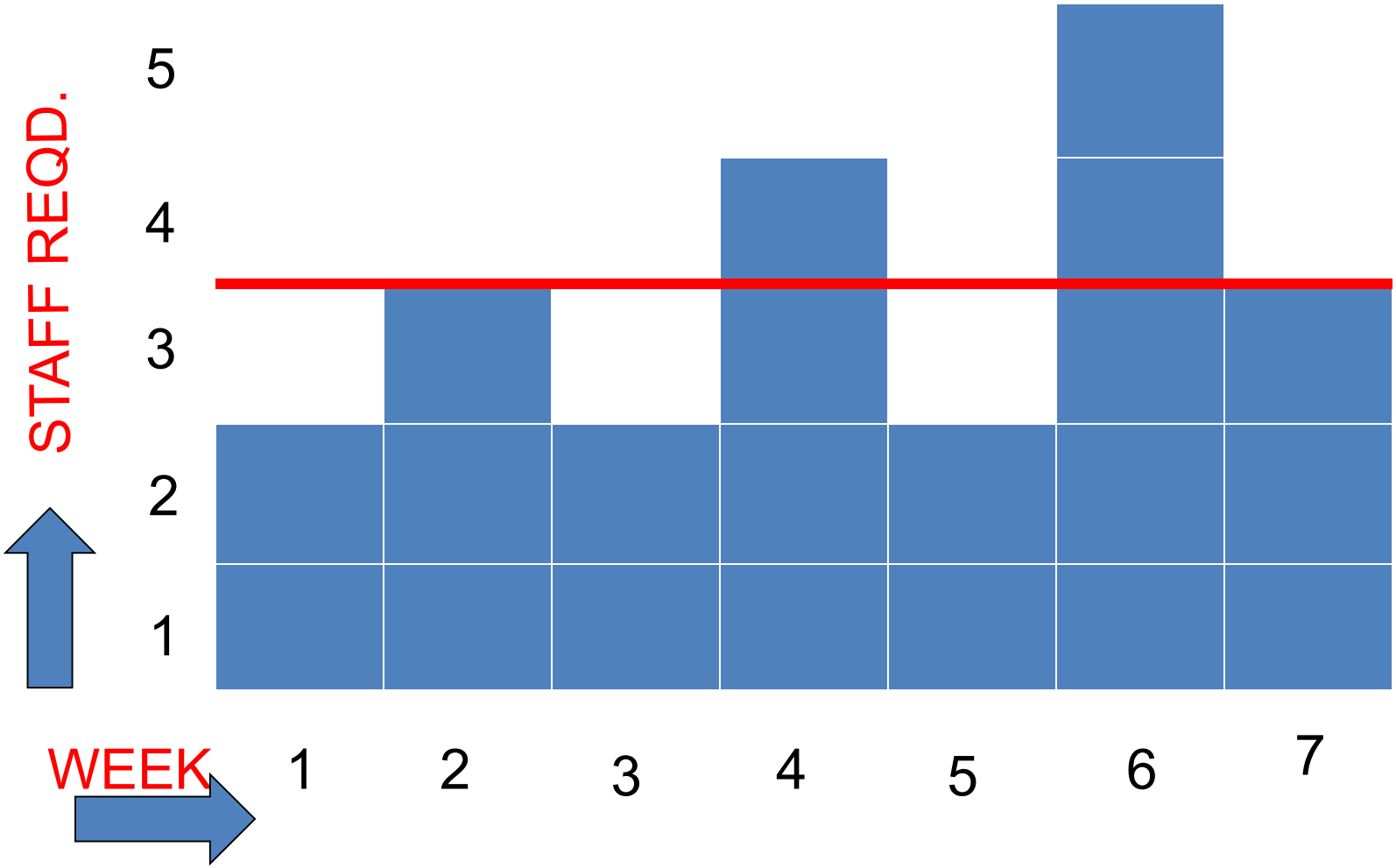
Resource Histogram

- Resource histogram is specifically a bar chart that is used for the purposes of displaying the specific amounts of time that a particular resource is scheduled to be worked on over a predetermined and specific time period.
- It allows a quick and easy single page view of exactly what resources are available, what resources are being utilized at the present time (or at whatever time the project management team is seeking information on), and how long those resources are expected to be tied up.

Resource Histogram



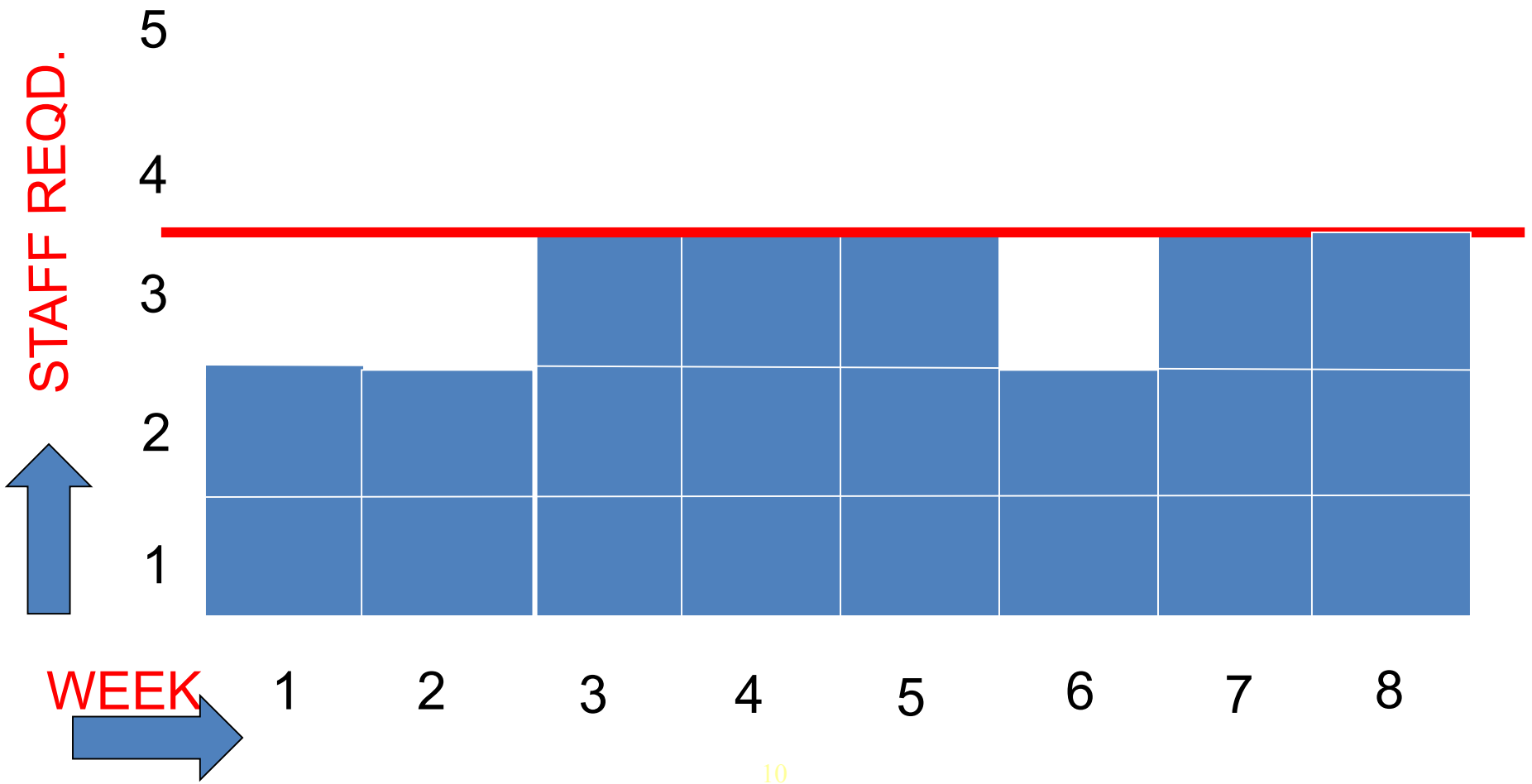
Resource histogram: systems analysts



Resource smoothing

- It is usually difficult to get specialist staff who will work odd days to fill in gaps – need for staff to learn about application etc
- Staff often have to be employed for a continuous block of time
- Therefore desirable to employ a constant number of staff on a project – who as far as possible are fully employed
- Hence need for resource smoothing

Resource smoothing



Resource Over- Allocation

- Resource over-allocation happens when assignments of more tasks than the resources can handle or reasonably complete within a standard eight hour/day work week are assigned.
- When a company has many projects, resource over-allocation is a risk, especially if the resources are small and involved in multiple tasks.
- When this happens, the projects may stall, come to a complete stop or fail.

Resource Allocation

There are 6 Steps to perform a proper resource allocation and avoid resource over-allocation:

- Divide the Project into Tasks
- Assign the Resources
- Determine resource attributes
- Resource Leveling
- Re-allocate as necessary
- Track resource utilization

Resource Allocation

1. Divide the Project into Tasks

In project management, the project is divided into tasks and managed on a task, rather than a project, level. Resource allocation is an integral component of this process because each task is assigned the necessary resources, and the resources are managed by task.

ID	Task	Start	End	Budget
100	Dig Holes	July 1	July 10	$1,000
200	Build Fence	July 8	July 31	$9,000

Once the project is successfully divided into tasks, the resources can be assigned.

Resource Allocation

2. Assign the Resources

Each task requires resources in order to be successfully performed. As a minimum, most tasks require a human resource to carry out some actions. Usually, the person starts with some input materials which are used to produce an output.

Generally, there are five types of resources:

1. Labor
2. Equipment
3. Materials
4. Facilities
5. Miscellaneous

he resources are assigned to each task, so that the table looks like this:

ID	Task	Start	End	Budget	Resources
100	Dig Holes	July 1	July 10	$1,000	Bob, shovel
200	Build Fence	July 8	July 31	$9,000	Bob, Bill, shovel, fence posts, fence material

Resource Allocation

3. Determine Resource Attributes

Each resource comes with attributes (project manager lingo) which must be sufficient to carry out the project work.

These attributes include:

1. Grade
2. Skill
3. Quality
4. Availability
5. Resource-Specific Attribute
    1. Size
    2. Shape
    3. Color

Resource	Attributes	Availability
Bob		Needs 1 week notice
Shovel	▪ Garden style ▪ large	Immediately

Resource Allocation

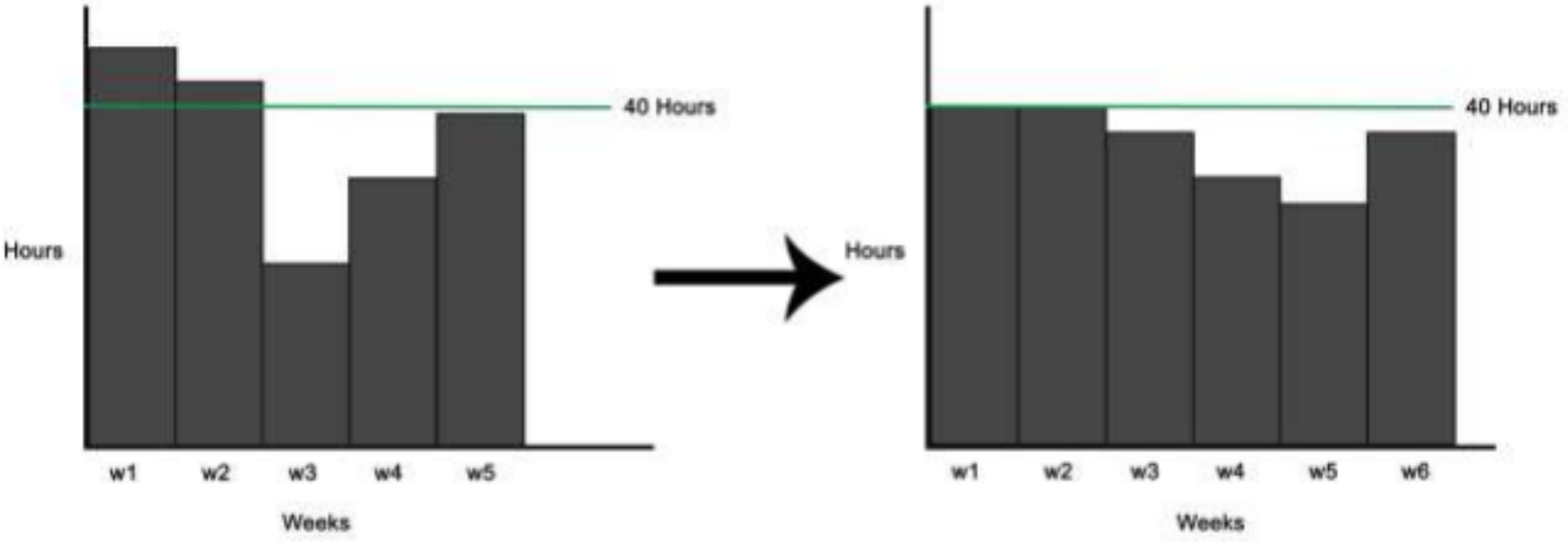
4.Resource Leveling

Resource leveling is a technique in project management that overlooks resource allocation and resolves possible conflict arising from over-allocation.

When project managers undertake a project, they need to plan their resources accordingly.

Resource Allocation

Resource Levelling



Resource Leveling

Resource Allocation

5.Re-allocate as Necessary

Resources **are** scarce. They sometimes do not show up on time, **are needed** by other projects, or lose their usefulness over time.

Many things can happen that require a shift of resources from one task to another, or a change in the project schedule or budget.

Resource Allocation

6. Track Utilization Rates

- It is a surprisingly common occurrence that a resource arrives at a project and sits idle for a long period of time.
- It is equally common that project managers have no idea that the resource is being paid for but not being used.
- A simple solution is to track resource utilization rates. The utilization rate is simply the percentage of billable time

Resource Allocation

6. Track Utilization Rates

Utilization Rate = Number of Billable Hours / Number of Total Hours

For example,

if Bill worked 4 hours out of a possible 40 hours for the week, his utilization rate is

4 / 40 = 10%.

Clearly this would suggest corrective action is warranted on the part of the project manager.

Need of Effective Resource Allocation

- Maintain accurate time log
- Save money
- Boost productivity
- Improve time management
- Improve staff morale
- Predict the future project plan
- Manage team workload
- Strategic planning
- Eliminate risk

Resource clashes

- Where same resource needed in more than one place at the same time
- can be resolved by:
  - delaying one of the activities
    - taking advantage of float to change start date
    - delaying start of one activity until finish of the other activity that resource is being used on - *puts back project completion*
  - moving resource from a non-critical activity
  - bringing in additional resource - *increases costs*

Prioritizing activities

There are two main ways of doing this:

- *Total float priority* – those with the smallest float have the highest priority
- *Ordered list priority* – this takes account of the duration of the activity as well as the float

Burman's priority list

Give priority to:

- Shortest critical activities
- Other critical activities
- Shortest non-critical activities
- Non-critical activities with least float
- Non-critical activities

Resource usage

- need to maximise %usage of resources i.e. reduce idle periods between tasks
- need to balance costs against early completion date
- need to allow for contingency

Critical path

- Scheduling resources can create new dependencies between activities –*critical chains*
- It is best not to add dependencies to the activity network to reflect resource constraints
  - Makes network very messy
  - A resource constraint may disappear during the project, but link remains on network
- Amend dates on **schedule** to reflect resource constraints

Allocating individuals to activities

The initial ‘resource types’ for a task have to be replaced by actual individuals.

Factors to be considered:

- Availability
- Criticality
- Risk
- Training
- Team building – and motivation

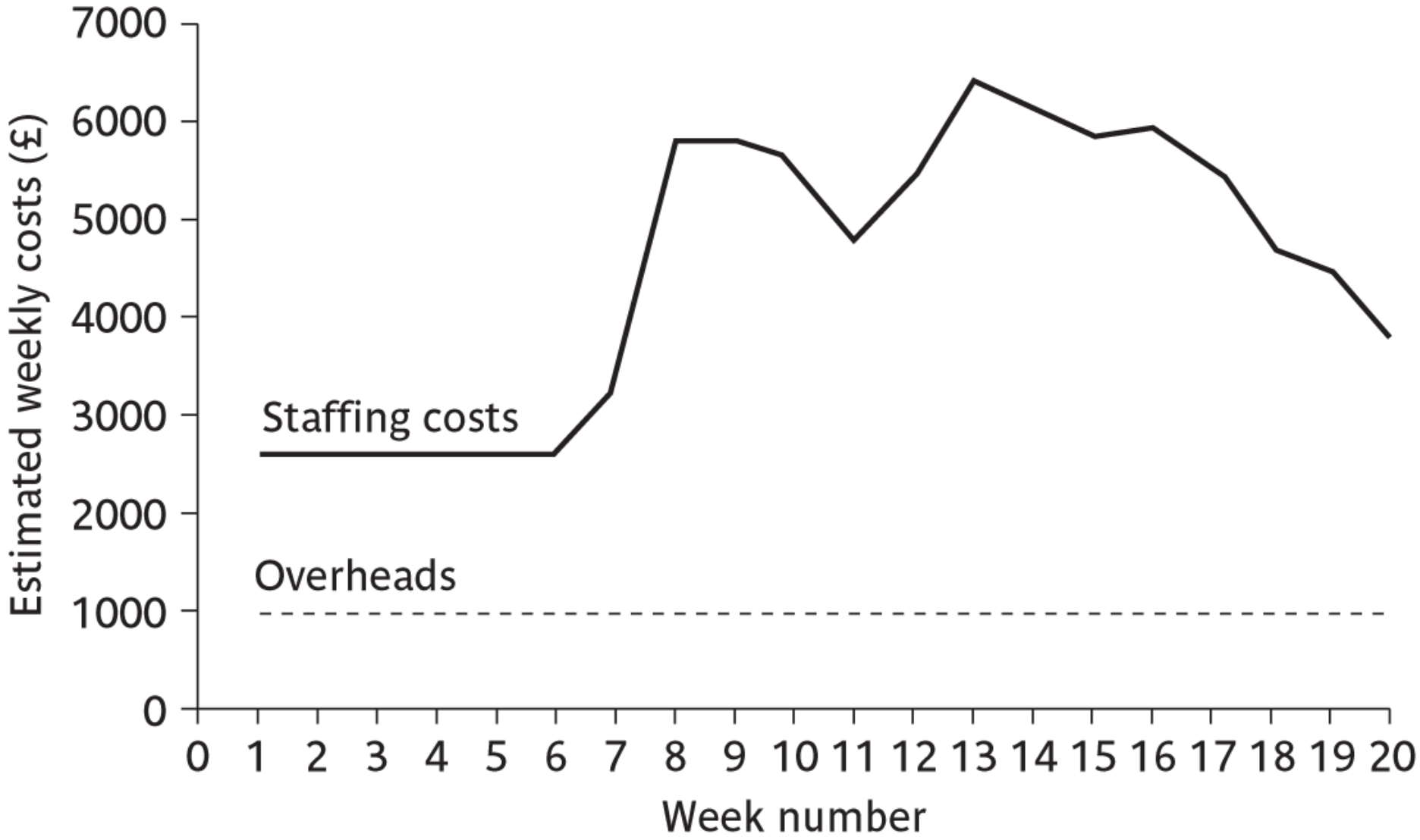
Cost schedules

Cost schedules can now be produced:

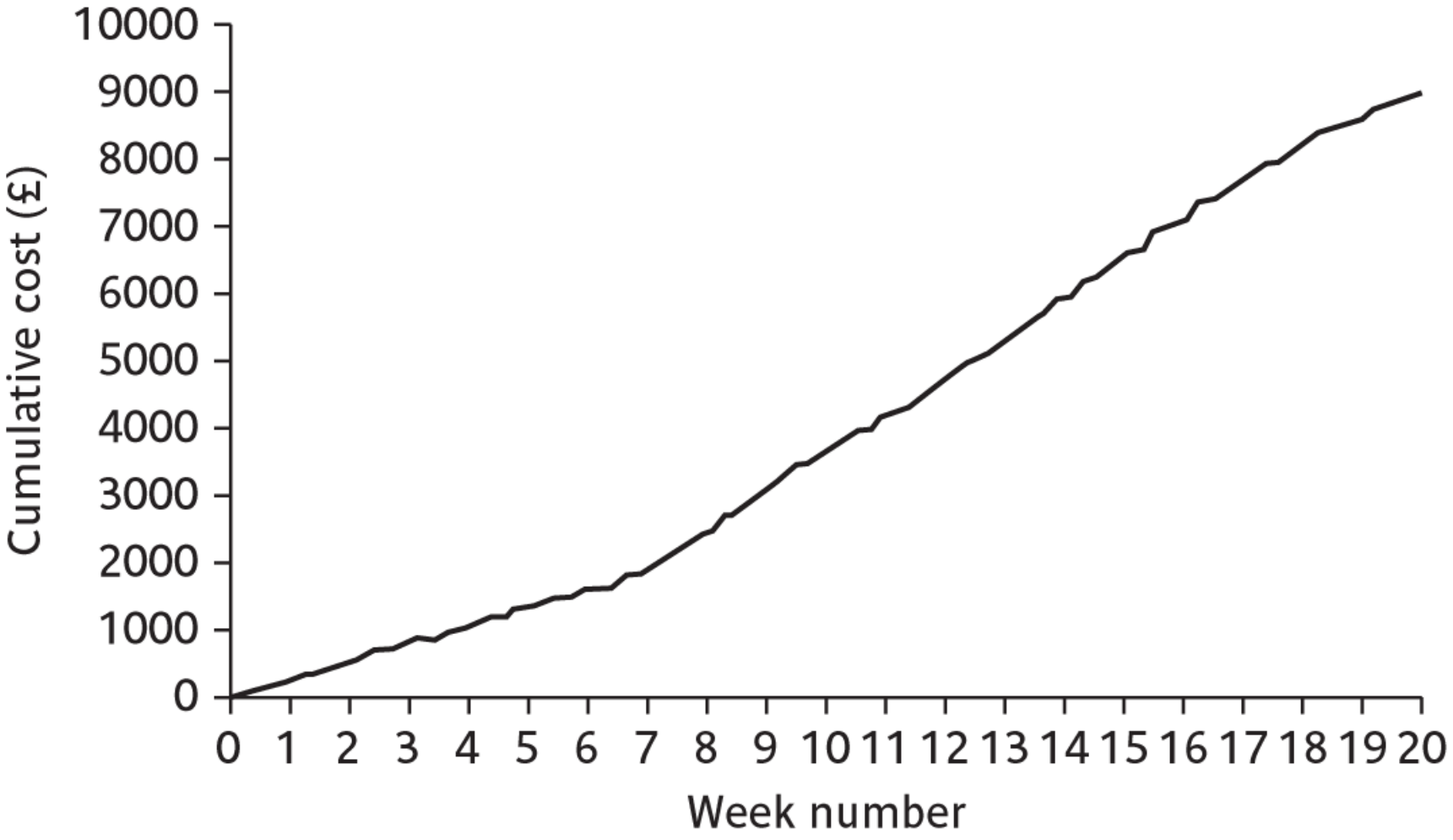
Costs include:

- Staff costs
- Overheads
- Usage charges

Cost profile



Accumulative costs



Balancing concerns