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Resource Leveling:

- It is a technique in project mgmt which helps to balance the use of available resources (such as personnel, equipments & materials) to avoid overallocat. or under utilization.
- It ensures that resources are allocated efficiently without exceeding their availability while maintaining project schd objectives.
- Why is Resource Leveling important?

i) Prevents Resource Overloading:- Ensures that no individual or equipment is assigned more work than they can handle at a given time.

ii) Optimizes Resource Utilizat^n:- Ensures that available resources are used effectively without idle time.

iii) Maintains Project Feasibility:- Keeps the proje realistic by aligning it with actual resource availability.

iv) Reduces Risk of Burnout & Delays:-
- Avoids over burdening team members, which can lead to decreased productivity, burnout or costly delays.

v) Improves Cost Efficiency:- Reduces unnecessary overtime or hiring additional resources unexpected

- Key Points of Resource Leveling:-
- Resource leveling primarily focuses on adjusting project schedules while keeping resource constraints in mind. It includes:-

i) Identifying Resource Constraints:-
- Resources (such as workers, machines or materials) have a limited capacity & availa
- Overloading resources (eg. assigning the same worker to multiple critical tasks) leads to inefficiencies.

- Project managers must identify resource constraints early using resource allocat. charts or workload reports

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ii) Adjusting the Schedule Based on Resource Availability:-

- If a resource is overallocated, project managers adjust task timings so that the workload is evenly distributed.
- This might result in delays to non-critical tasks, but it helps maintain overall project quality.

iii) Using Task Dependencies & Float:-

- Some tasks have flexibility (float/slack), meaning they can be delayed without impacting the projects final deadline.
- Resource leveling takes advantage of this float to rearrange or reschedule tasks.

* Methods of Resource Leveling:-

① Task Delaying (Shifting non-critical task)	② Task Splitting	③ Reassigning Work (Resource Substitut.n)
- Tasks that are not on the critical path can be moved forward or backword.	- In some cases, tasks can be split into multiple smaller tasks spread across different time periods to accommodate limited resource availability.	- If a resource is overloaded, tas can be assigne to other team members with similar skills.
- Ex. If a slw developer is working on two projects at the same time, one of them might be delayed until the developer is free.	- Task Splitting Ex. If a mic is needed for multiple tasks, its usage can be divided over multiple shifts instead of being continuously occupied.	- Ex. If a key engineer is overbooked, another qualifie engineer may tak over some task

④ Extending Project Duration:-

- When critical resources are limited & no other adjustments are possible, the project durat. may need to be extended.
- This approach is used when quality & resource availability are more important than meeting a fixed deadline.