CB 510
Project Management

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Time Cost Tradeoff (AKA, Crashing)

- Project duration depends on the resources type and amount per activity.

- Conventionally, increase in resource utilization or the use of higher productive resources will increase the project cost.

- The comparison of duration vs cost is called time-cost tradeoff.

Time-Cost Tradeoff

- Why do we need to reduce project time?

  - Finish project on an earlier date.

  - Accelerate the project after delays

  - Avoid site constraints in the future
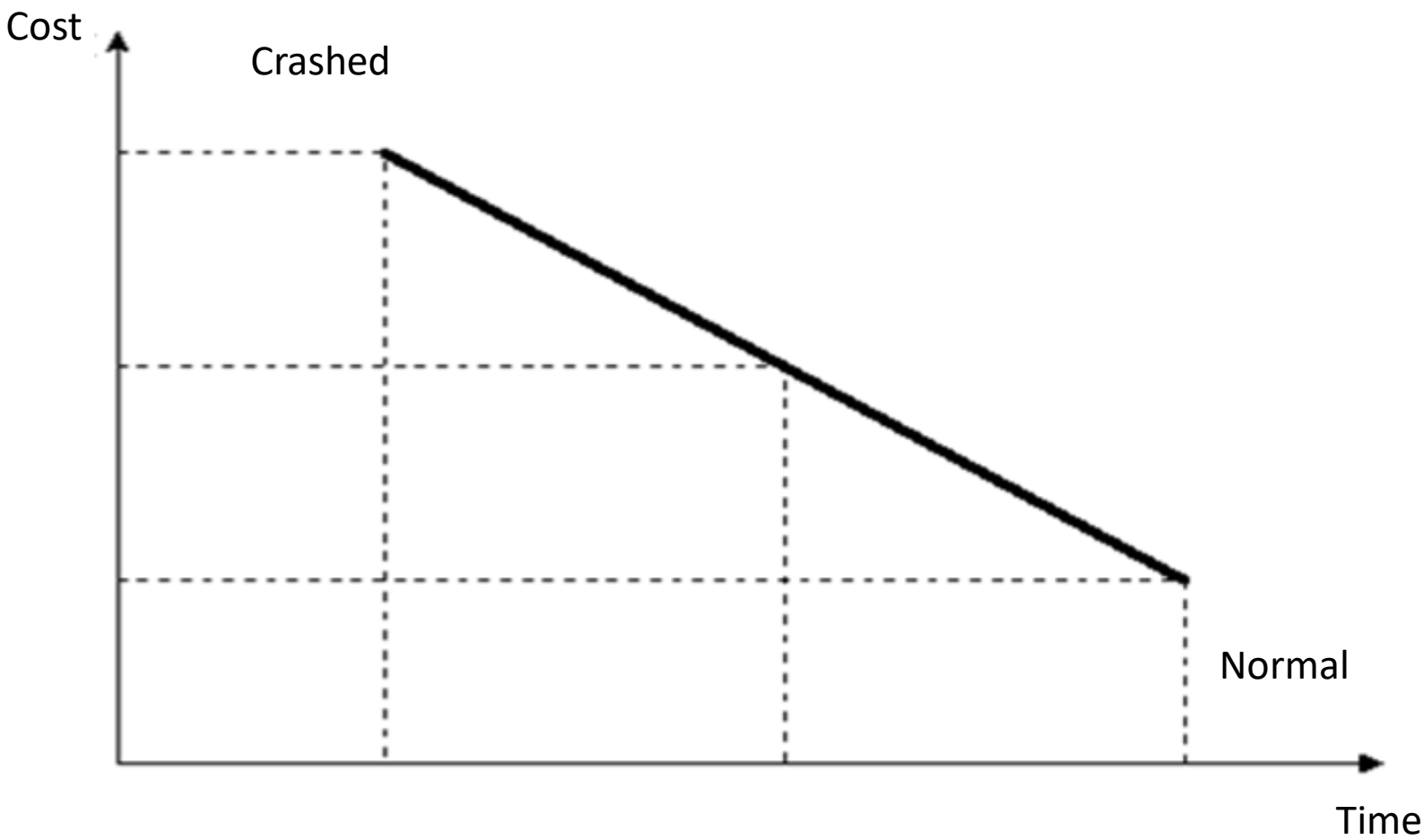
  - Free key resources (TBM)

Time-Cost Tradeoff

- How to reduce the activities duration?

  - Working extended hours

  - Utilize more crews

  - Use different materials with higher production rates

  - Constructing using different methods
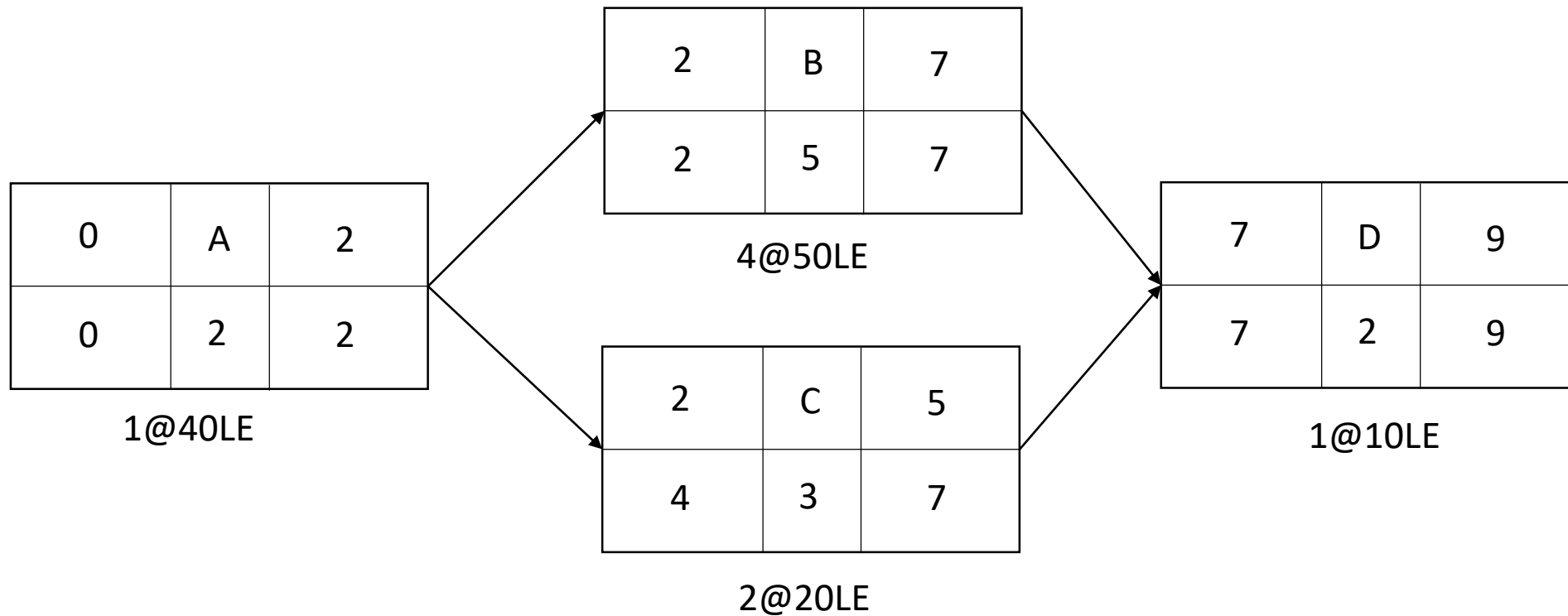
Time-Cost Tradeoff – Activity level
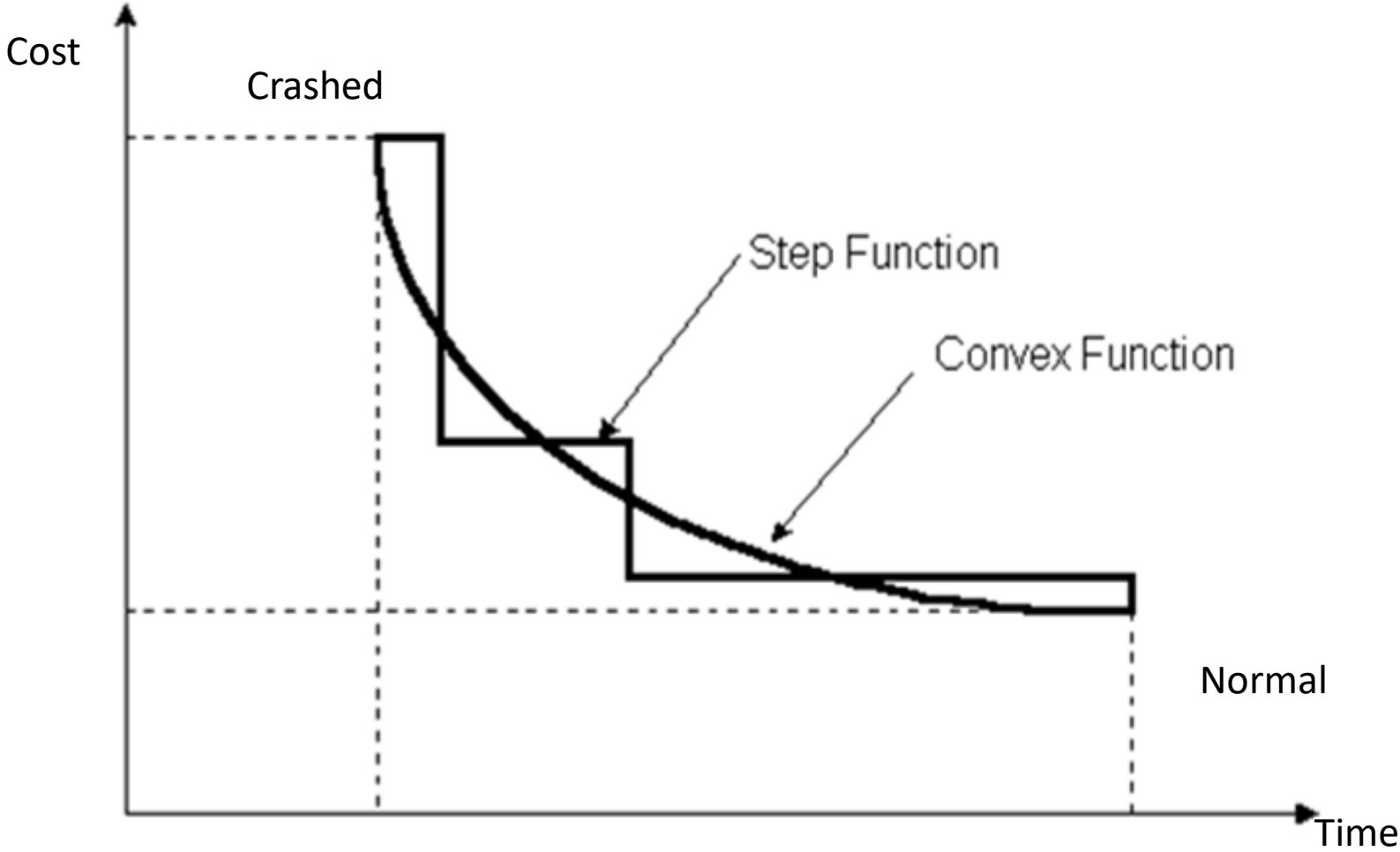
Time-Cost Tradeoff – Activity level

Crashing Activities
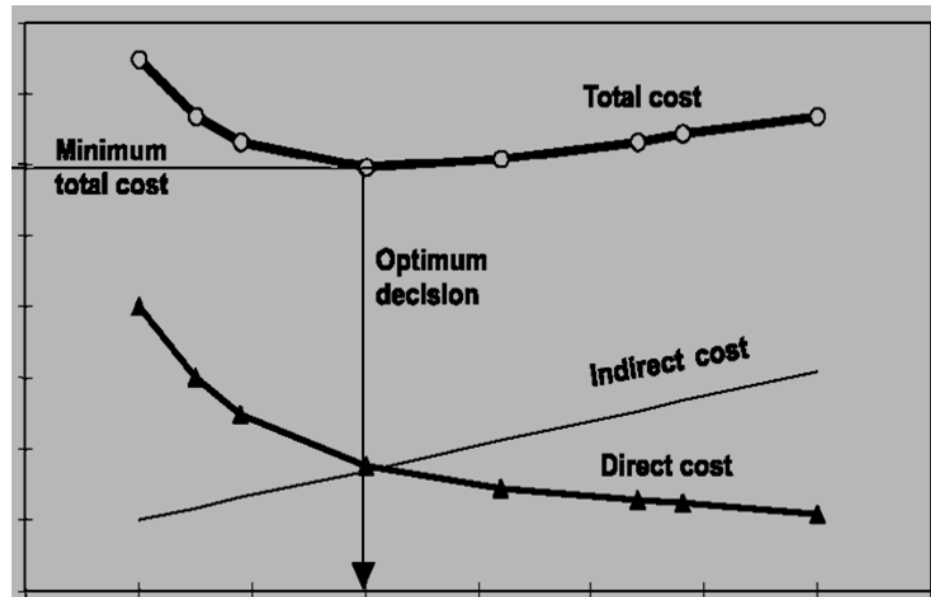
- How do you crash this project?

Heuristic Cost-Slope Method

- Draw project network
- Perform CPM using normal duration
- Compute cost slope for each activity

> Cost slope = (crash cost – normal cost) / (normal duration –crash duration)

- Reduce the duration of critical activities with least cost slope, one step at a time, until its crash duration is reached or until the critical path is about to change.
- Continue until no more activities can be crashed.
- Make sure to tabulate your results

Optimal Project Duration

- With the reduction on project duration, an increase in the construction cost will occur

- However, with such reduction, the total indirect cost is also decreased

Example

• Consider the following project with indirect cost of 125LE/day, crash this project to 49 days.

Activity	Predecessor	Normal		Crash	
		Duration (day)	Cost (LE)	Duration (day)	Cost (LE)
A	-	12	7000	10	7200
B	A	8	5000	6	5300
C	A	15	4000	12	4600
D	B	23	5000	23	5000
E	B	5	1000	4	1050
F	C	5	3000	5	3000
G	E,C	20	6000	15	6300
H	F	13	2500	11	2580
I	D,G,H	12	3000	10	3150