CB 519
Construction Project Management 2

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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.

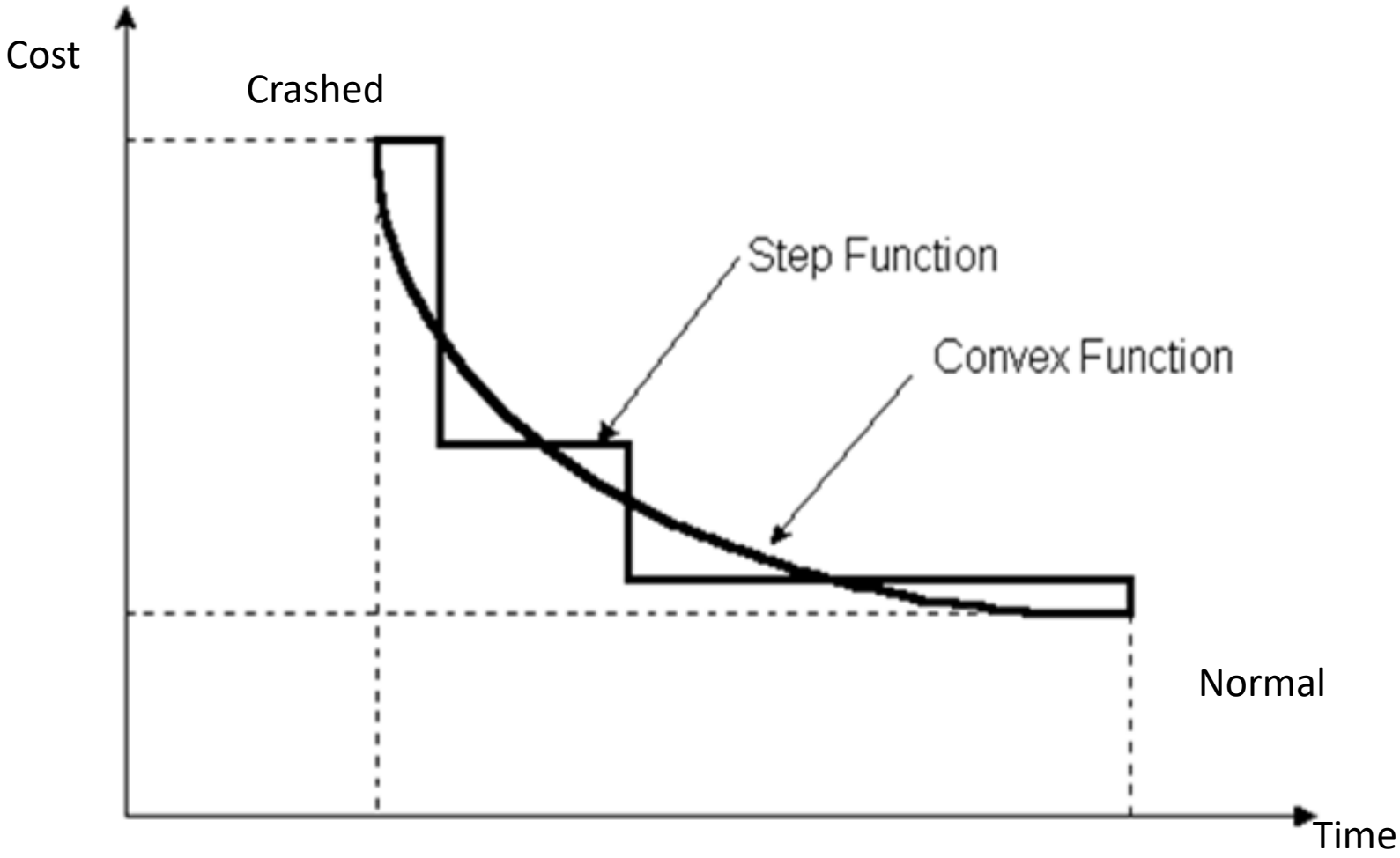
Time-Cost Tradeoff

- 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)

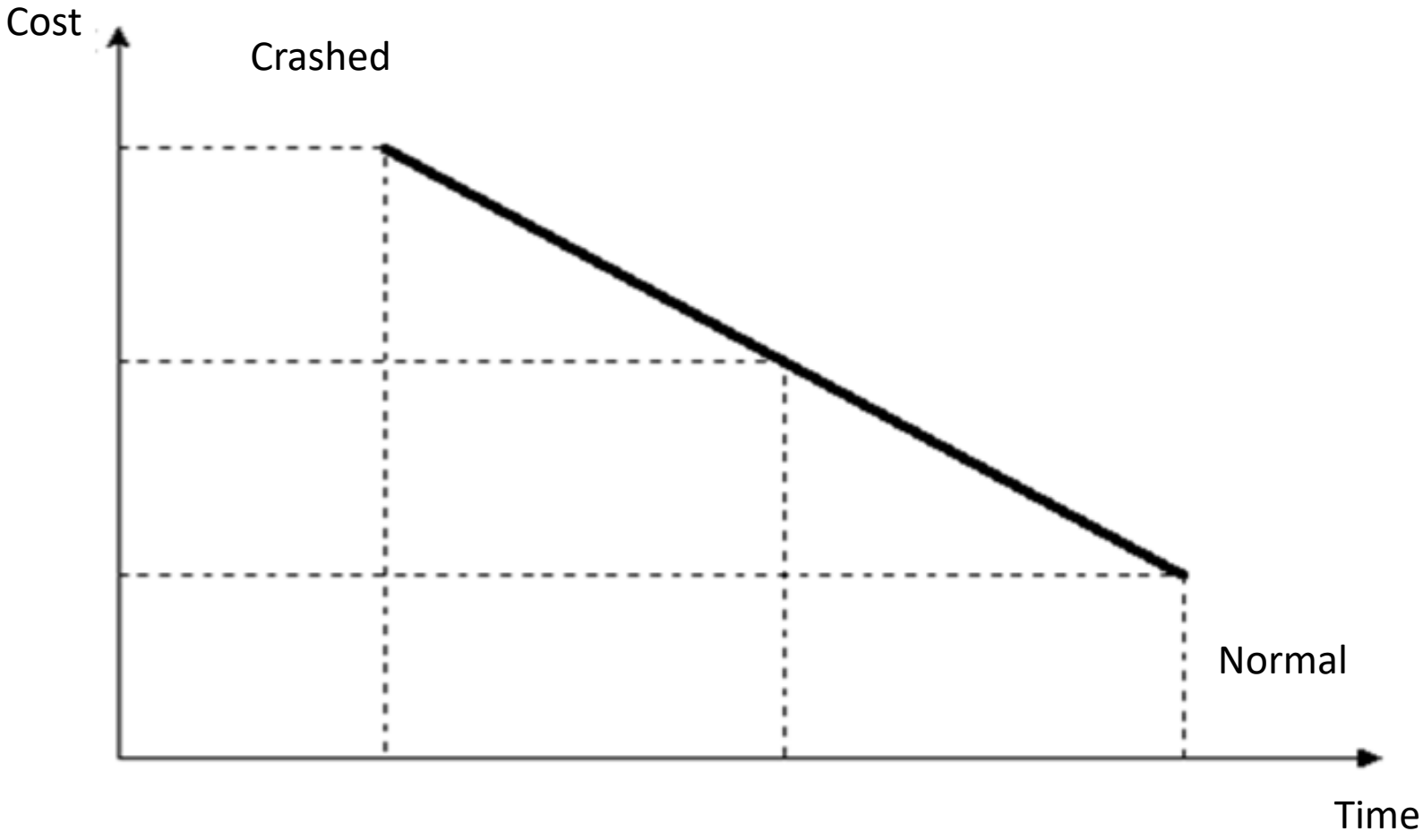
Time-Cost Tradeoff

- 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

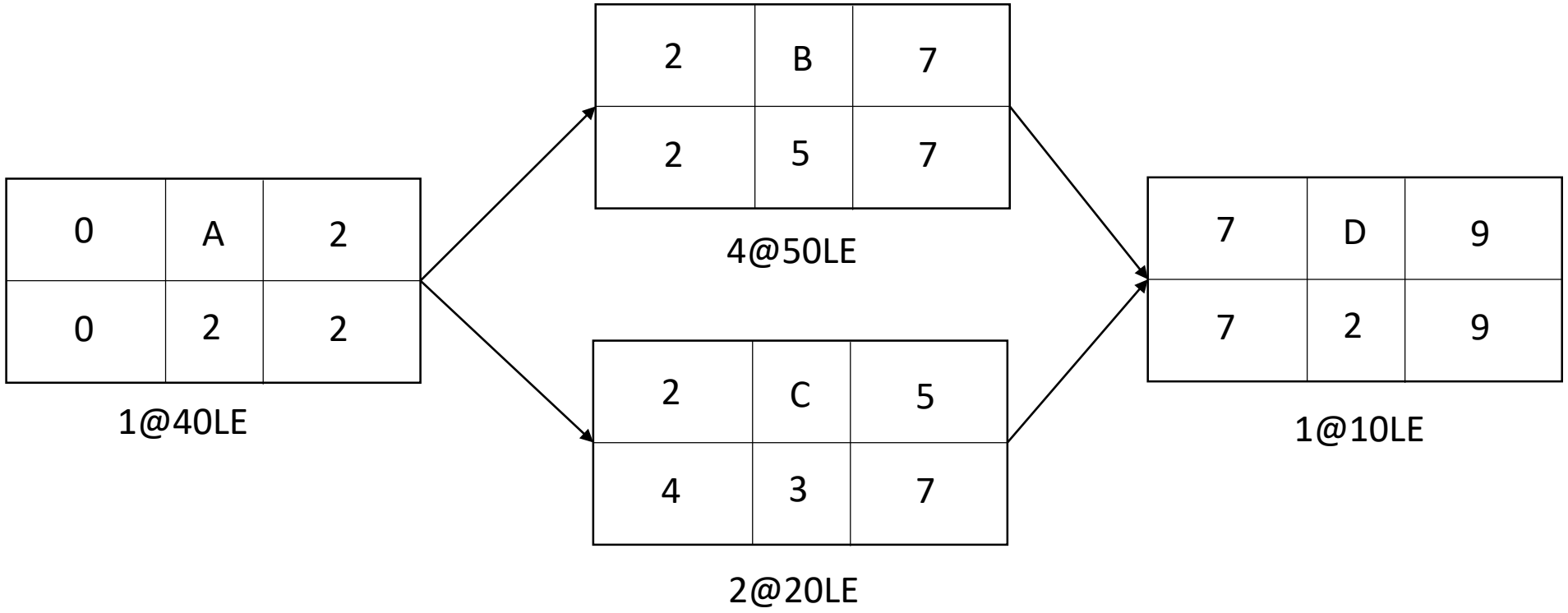


Time-Cost Tradeoff – Activity level



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

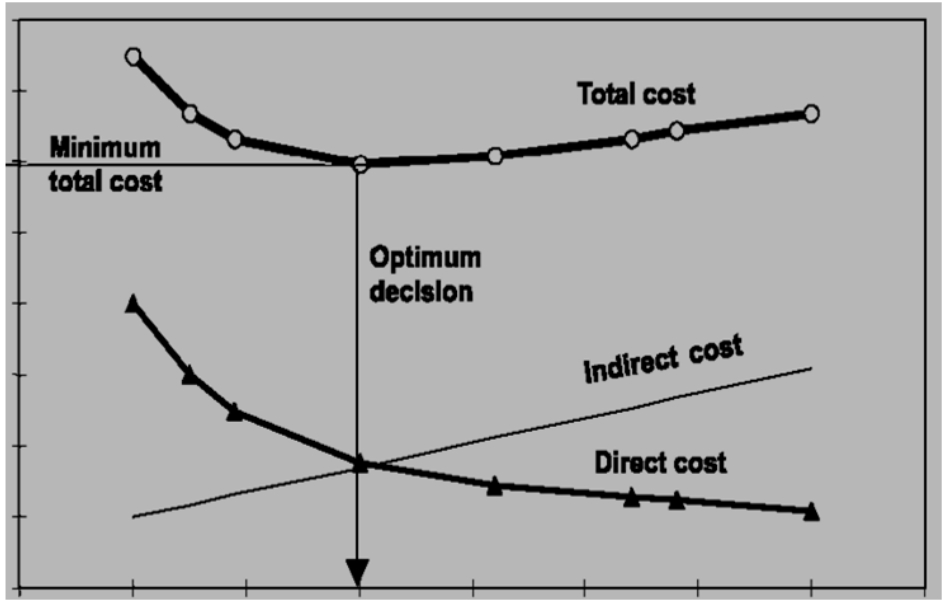
  Cost slope = (crash cost – normal cost) / (normal duration –crash duration)

- Reduce the duration of critical activities with least cost slope, one step at a time, until its crash duration is reached until the critical path has changes
- 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	3300
G	E,C	20	6000	15	6300
H	F	13	2500	11	2580
I	D,G,H	12	3000	10	3150