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a. Gantt Chart for Custom Metal Products Company

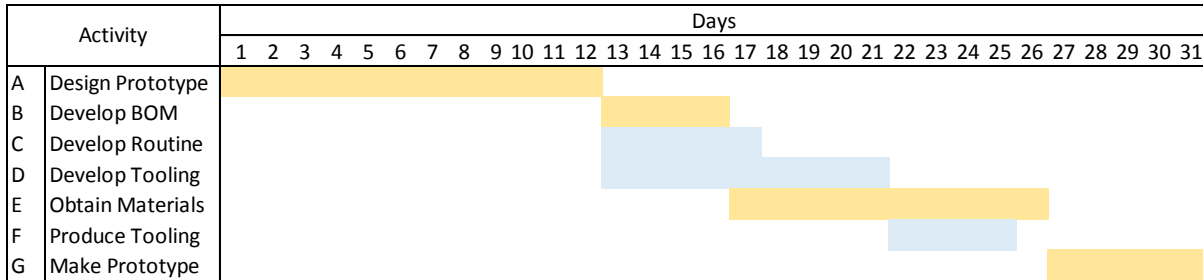
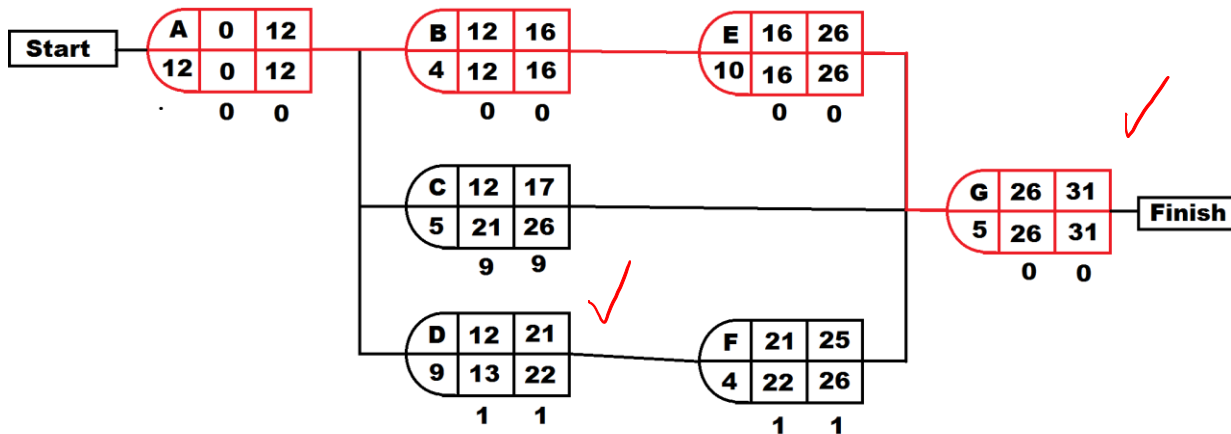


Figure 1: Normal Timeline

Target 28 Days	Critical Path
Crash Cost	0

b. Network Diagram



c. The table below lists the seven necessary activities for the project, their associated periods and costs with respect to Normal Time, Crash Time, and the Crash Cost Slope.

Table 1: Project cost analysis per day

Activity	Normal Time		Crash Time		Cost Slope \$/day
	Days	Cost (\$)	Days	Cost (\$)	
A Design Prototype	12	3000	8	8000	1250
B Develop BOM	4	1000	2	2000	500
C Develop Routine	5	2000	3	3500	750
D Develop Tooling	9	5000	6	9000	1333
E Obtain Materials	10	0	10	0	1250
F Produce Tooling	4	2000	2	3000	500
G Make Prototype	5	6000	3	9000	1500
Total	31	18000	23	34500	

The project duration must not exceed 28 days. The steps to reduce individual activities to crash times are represented by Gantt Charts below in *Figure 2* and *Figure 3*.

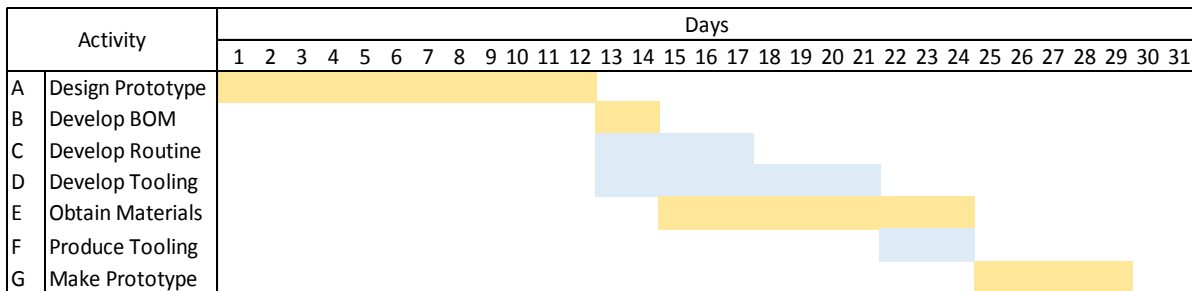


Figure 2: Crash Time - Reduce B by two days & F by one day

Target 28 Days	Critical Path	
Crash Cost	1500	
Total Cost	19500	

The first step is to reduce activity B by two days and activity F by one day. If only Activity B was reduced by two days, Activity F would become a step in the critical path. Reducing both would allow Activity G to start on the 25th day. The total crash cost for this step is \$1,500 (\$1000 to reduce Action B by two days and \$500 to reduce Activity F by one day) making the total cost \$19,500.

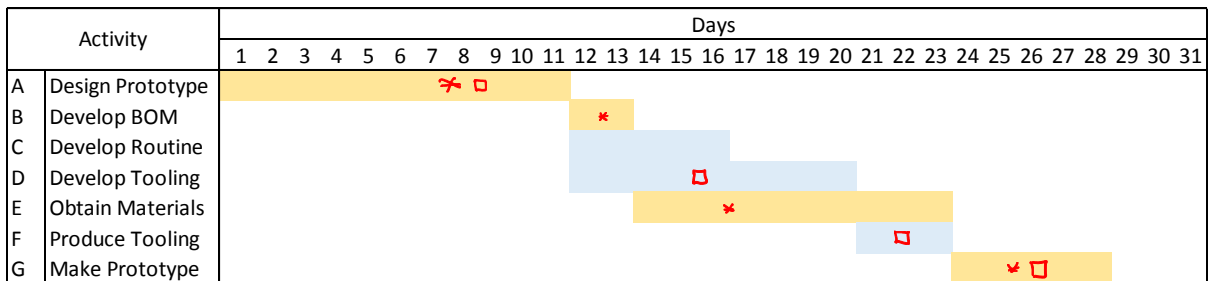


Figure 3: Crash Time - Reduce A by one day

Target 28 Days	Critical Path	
Crash Cost	1250	
Total Cost	20750	

Two CRITICAL PATHS
 * A-B-E-G
 □ A-D-F-G

The second step is to reduce Activity A by one day to bring the entire project down to 28 days in duration. The cost to crash Activity A by one day is \$1,250 making the total project cost \$20,750.

If the project needed to be shortened further, it would be possible to reduce Activity A up to three additional days at a total extra crash cost of \$3,750, making the total project cost \$24,500, and have a duration of 25 days.

- d. The cost of each activity, the number of days, and the associated total project cost are shown in Table 2.

Table 2: Total Cost of Crashed Project Breakdown by Activity

Activity		Normal Time		Crash Time		Total Time	
		Days	Cost (\$)	Days	Cost (\$)	Days	Cost (\$)
A	Design Prototype	12	3000	1	1250	11	4250
B	Develop BOM	4	1000	2	1000	2	2000
C	Develop Routine	5	2000			5	2000
D	Develop Tooling	9	5000			9	5000
E	Obtain Materials	10	0			10	4250
F	Produce Tooling	4	2000	1	500	3	2500
G	Make Prototype	5	6000			5	6000
Total		31	18000	4	2750	28	20750

oops ~~19,000~~ ~~21,750~~

- e. The events in the critical path do not change after the final reduction to 28 days. Regardless of further reduction to any subsequent action, all actions require Activity A to be complete before starting. Reducing the time spent on Activity B will enable Activity E to commence; however, because Activity E cannot be reduced, Activity G will have to wait until E is finished. It was important to crash Activity F by one day so it would not become a critical path event when Activity E finished on day 24 rather than day 26 as originally scheduled.
- f. The total number of days for all paid activities is 35 days, making each paid day worth approximately \$600.

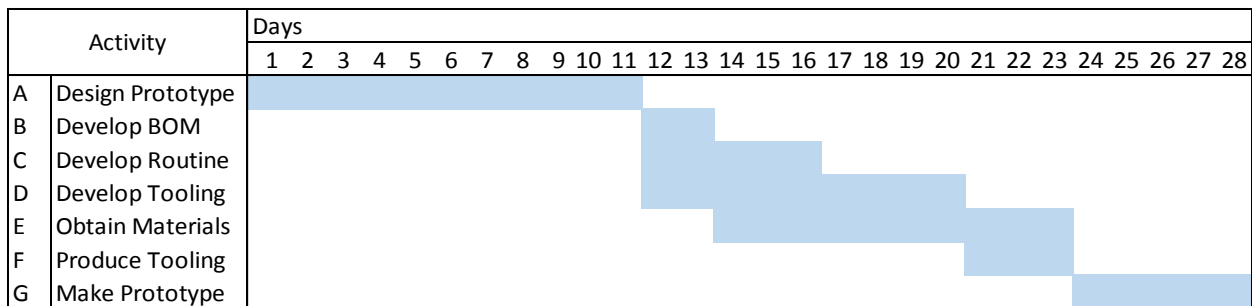


Figure 4: Crashed Project