



تطبيق طريقة المسار الحرج (CPM) على متابعة تنفيذ إنشاء مصنع

مجال التدريب:

- إدخال بيانات المشروع (الأنشطة، الموارد، التقويم الزمني، التكاليف).
- الحصول على التحليل الشبكي.
- تحديد المسار الحرج للمشروع.
- طبع كل نشاط وتوقيتاته الزمنية وموارده.
- طبع تكاليف المشروع حسب النشاط.

الحالة:

- تصور أنك تعمل في مكتب هندسي استشاري، أو بأحد أقسام متابعة تنفيذ المشروعات الصناعية في أحد الوزارات (وزارة تخطيط، أو صناعة، أو غيرها). وطلب منك من قبل مسؤولك الفني إعداد تقرير حول متابعة تنفيذ مشروع بناء مصنع، باستخدام أحد البرامج التي تستخدم في هذا المجال. وليكن برنامج "PROJ"، وذلك في ظل المعلومات أدناه.
- يبدأ مشروع الإعداد لبناء مصنع في 1 يناير 2013، وتصميم التشييد في 1 أكتوبر 2013 ولمدة (9) أشهر. ويحتل المصنع مساحة (300) متر مربع، ويكلف (75) ألف دينار كويتي.

- ولغرض تخطيط وتنفيذ هذا المشروع استخدم برنامج "PROJ" وقوائم المعلومات (5-1) لإدخال البيانات الخاصة بمتابعة تنفيذ المشروع. واستخدم الوظائف التالية: النشاط، المورد، التقويم الزمني، الساعات، التحليل الشبكي...).



Project Information Worksheet

Identify the following:

Goal(s)

FACTORY CONSTRUCTION PROJECT

Objectives:

Project Planning & Control of Implementation

Specify the total amount of time allotted to the completion of this project: (in hours, days, weeks, months, and/or years (if known)). 6-8 months

Specify the (total, maximum or approximate) amount of money allocated to this project (if known).
K.D. 60,000

Start Date: (indicate how firm the date is) Month Oct. Day 1st Year 1993

Finish Date: (indicate how firm the date is) Month ____ Day ____ Year ____

List any other fixed dates:

Activity: # Month ____ Day ____ Year ____ Comments: _____

Month ____ Day ____ Year ____ Comments: _____

Month ____ Day ____ Year ____ Comments: _____

Month ____ Day ____ Year ____ Comments: _____

Circle days for Standard workweek: Sun Mon Tues Wed Thurs Fri Sat Sun

List any civil and/or religious holidays that will occur during the course of the project:

Month ____ Day ____ Year ____, Month ____ Day ____ Year ____

Month ____ Day ____ Year ____, Month ____ Day ____ Year ____

Define the Standard workday in terms of hours worked:

Starting time 7 a.m. Quitting time 4 p.m.

Start Lunch 12 p.m. Finish Lunch 1 p.m.



LIST OF ACTIVITIES

Instructions: List all discreet Activities that you now believe will have to be performed during the course of the project (more can be added).

Include: Tasks that must be performed over time, as well as, Events that do not occur over time.

List (use abbreviations. 15 characters <u>max</u> (including spaces) are available.			
1	Project Start	18	Door frames
2	Project Design	19	A.C. Ducts
3	Labour Provision	20	Internal Plastering
4	Equipments Provision	21	Flooring (ceramic tiles)
5	Materials Provision	22	Flooring (terrazzo tiles)
6	Survey	23	False Ceiling
7	Excavation	24	External Clading
8	Foundation	25	Aluminium Works
9	Curing I	26	Wooden Doors
10	Back Filling	27	Internal Painting
11	Superstructure	28	Painting Woodworks
12	Curing II	29	Ceramic Walls
13	Walling	30	Sanitary Fittings
14	Roof Insulation (humidity)	31	Electrical Fittings & Cabling
15	Roof Insulation (heat)	32	A.C. Machines
16	Electrical Works	33	Commissioning & Cleaning
17	Plumbing	34	Project End

ACTIVITY Worksheet

For each Activity identify: A. Duration: (\emptyset) B: In: hours, days, (weeks), or months

C. Start Date (ASA)) D. Finish Date: (ASAP) E: Prdecessor Activity(s):

Note: MICROSOFT Project will ask you to provide this information. If you do not, MICROSOFT makes a selection for you. That selection is shown in () for each item.

ACT #	ACTIVITY	A. Duration	B. Scale	C. Start	D. Finish	E. # Predecessor Activities
1.	Project Start	0	--	ASAP	ASAP	--
2.	Project Design	4	Weeks	"	"	1
3.	Labour Prov.	7	days	"	"	2
4.	Equip. Prov.	7	"	"	"	2
5.	Mat. Prov.	14	"	"	"	2
6.	Survey	2	"	"	"	3,4
7.	Excavation	7	"	"	"	6
8.	Foundation	12	"	"	"	5,7
9.	Curing (I)	7	"	"	"	8
10.	Back Filling	4	"	"	"	9
11.	Superstructure	18	"	"	"	10
12.	Curing (II)	14	"	"	"	11
13.	Walling	10	"	"	"	12
14.	Roof Ins. (hum.)	3	"	"	"	12
15.	Roof Ins. (heat)	2	"	"	"	14

ACT #	ACTIVITY	A. Duration	B. Scale	C. Start	D. Finish	E. # Predecessor Activities
16.	Elect. Works	7	Days	ASAP	ASAP	13
17.	Plumbing	7	"	"	"	13
18.	Door frames	2	"	"	"	13
19.	A.C. Ducts	7	"	"	"	16
20.	Int. Plastering	17	"	"	"	17,18,19
21.	Flooring (ceram.)	2	"	"	"	15,20
22.	Flooring (terraz.)	15	"	"	"	15,20
23.	False Ceiling	15	"	"	"	15,20
24.	Ext. Clading	20	"	"	"	17,18,19
25.	Alum. Works	10	"	"	"	20,24
26.	Wooden Doors	4	"	"	"	23
27.	Int. Painting	10	"	"	"	26
28.	Paint, Woodwork	4	"	"	"	26
29.	Ceramic Walls	3	"	"	"	26
30.	Sanitary Fitt.	7	"	"	"	21,22
31.	Elec. Fitt. & Cabl.	5	"	"	"	23
32.	A.C. Machines	10	"	"	"	31
33.	Commis. & Clean.	4	"	"	"	25,27,28,29,30,32
34.	Project End	0	-	"	"	33

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 1. Project Start				
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 0				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 2. Proj. Design	Cons. Office 1			
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 Weeks				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 3. Labour Prov.	Contractor 0.3	Site Eng. 0.3	Supervisor 0.3	Overheads 0.3
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 4. Equip. Prov.	Contractor 0.3	Site Eng. 0.3	Supervisor 0.3	Overheads 0.3
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 14 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 5. Mat. Prov.	Contractor 0.4	Site Eng. 0.4	Supervisor 0.4	Overheads 0.3
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 14 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 6. Survey	Site Eng. 0.6	Surveyor 1	Helper 1	
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 2 days				

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 7. Excavation	Site Eng. 0.6	Supervisor 0.6	Labour 5	
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 8. Foundation	Site Eng. 1	Supervisor 1	Carpenter 3	Barbender 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 12 days	Mason 2	Labour 12	Concrete Mat. 70	
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 9. Curing (I)	Site Eng. 1	Supervisor 1	Helper 1	Water 7
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 10. Back Filling	Site Eng. 1	Supervisor 1	Labour 1	
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 days				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 11. Superstructure	Site Eng. 1	Supervisor 1	Carpenter 1	Barbender 4
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 18 days	Mason 2	Labour 15	Concrete Mat. 100	
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 12. Curing (II)	Site Eng. 1	Supervisor 1	Helper 1	Water 14
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 14 days				

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 13. Walling	Site Eng. 0.5	Supervisor 0.5	Mason 3	Helper 3
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 10 days	Blocks 500	Mortar 1000		
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 14. Roof Ins. (hum)	Site Eng. 0.5	Supervisor 0.5	Insulator 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 3 days	Hum.Ins.Mat. 300			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 15. Roof Ins. (heat)	Site Eng. 0.5	Supervisor 0.5	Insulator 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 2 days	Heat Ins.Mat. 300			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 16. Elec. Works	Site Eng. 0.4	Supervisor 0.4	Electrician 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days	Conduits & Boxes 1			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 17. Plumbing	Site Eng. 0.4	Supervisor 0.4	Plumber 2	Helper 3
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days	Mason 1	Cast Iron 50	Copper 100	
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 18. Door Frames	Site Eng. 0.2	Supervisor 0.2	Carpenter 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 2 days	D.frames 13			

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 19. A.C. Ducts	Site Eng. 1	Supervisor 1	Fabricator 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days	Ducts 1			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 20. Int. Plastering	Site Eng. 0.5	Supervisor 0.5	Plasterer 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 17 days	Mortar 1000			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 21. Flooring (Ceram.)	Site Eng. 0.1	Supervisor 0.1	Cer.Fixer 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 2 days	Cer.Tiles 15	Mortar 50		
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 22. Flooring (terraz.)	Site Eng. 0.2	Supervisor 0.2	Ter.Fixer 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 15 days	Ter.Tiles 250	Mortar 250		
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 23. Fallsealing	Site Eng. 0.2	Supervisor 0.2	FS Fixer 1	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 15 days	FS Mat. 250			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 24. Ext. Clading	Site Eng. 0.5	Supervisor 0.5	Mason SLB 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 20 days	SL Bricks 250	Mortar 250		

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 25. Alum. Works	Site Eng. 0.6	Supervisor 0.6	Alum.Fixer 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 10 days	Alum.& Glass 35			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 26. Wooden Doors	Site Eng. 0.4	Supervisor 0.4	Carpenter 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 days	Doors 13			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 27. Int. Painting	Site Eng. 0.1	Supervisor 0.1	Painter 1	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 10 days	Painting Mat. 1000			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 28. Paint Woodwork	Site Eng. 0.1	Supervisor 0.1	Painter Woodw. 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 days	Wood Paint 13			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 29. Ceramic Walls	Site Eng. 0.1	Supervisor 0.1	Cer. Fixer 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 days	Cer. Tiles 110	Mortar 110		
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 30. Sanitary Fitt.	Site Eng. 0.3	Supervisor 0.3	Plumber 1	Helper 1
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 7 days	San.Fittings 1			

Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 31. Elec. Fitting & Cables	Site Eng. 0.3	Supervisor 0.3	Electrician 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 5 days	Elec.Fittings 1			
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 32. A.C. Machines	Site Eng. 0.1	Supervisor 0.1	A.C. Tech. 2	Helper 2
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 10 days	Electrician 1	A.C.Mach. 2		
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 33. Commis. & Clean.	Site Eng. 1	Supervisor 1	Electrician 0.5	Plumber 0.5
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 4 days	A.C.Tech. 0.5	Helper 4	Contractor 1	
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
# 34. Project End				
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
Duration: 0				
Activity # and name	Resource 1st Amt.	Resource 2nd Amt.	Resource 3rd Amt.	Resource 4th Amt.
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.
	Resource 5th Amt.	Resource 6th Amt.	Resource 7th Amt.	Resource 8th Amt.



RESOURCE LIST

Instructions: List all discreet Activities that you now believe will have to be performed during the course of the project (more can be added).

Identify the capacity and cost (per time, use or fixed fee) associated with the use of this resource.

#	Resource (Human, Material)	No Limit	Cost (KD)	Per: Hour, Day, Week, Month Use, or Fixed
1.	Site Eng.	"	600	Month
2.	Supervisor	"	350	"
3.	Surveyor	"	350	"
4.	Helper	"	150	"
5.	Labour	"	200	"
6.	Carpenter	"	250	"
7.	Barbender	"	250	"
8.	Mason	"	250	"
9.	Concrete Mat.	"	30	Use (per m ³)
10.	Water	"	1	Use (per m ³)
11.	Blocks	"	1.8	Use (per m ²)
12.	Mortar	"	0.2	Use (per m ²)
13.	Insulator	"	250	Month
14.	Hum. Ins. Mat.	"	1.5	Use (per m ²)
15.	Heat Ins. Mat.	"	3.0	Use (per m ²)
16.	Electrician	"	250	Month
17.	Conduits & Boxes	"	150	Fixed
18.	Plumber	"	250	Month
19.	Cast Iron	"	5	Use (meter)
20.	Copper	"	3	Use (meter)
21.	Door Frames	"	10	Use (per unit)
22.	Fabricator	"	200	Month



#	Resource (Human, Material)	No Limit	Cost (KD)	Per: Hour, Day, Week, Month Use, or Fixed
23.	Ducts	"	100	Fixed
24.	Plasterer	"	250	Month
25.	Cer. Fixer	"	500	Month
26.	Cer. tiles	"	6	Use (per m ²)
27.	Ter. Fixer	"	300	Month
28.	Ter. Tiles	"	1.3	Use (per m ²)
29.	FS. Fixer	"	300	Month
30.	FS. Mat	"	4	Use (per m ²)
31.	Mason SLB	"	450	Month
32.	SL Bricks	"	3.25	Use (per m ²)
33.	Alum. Fixer	"	300	Month
34.	Alum. & Glass	"	15	Use (per m ²)
35.	Door	"	25	Fixed (per door)
36.	Painter	"	300	Month
37.	Painting Mat.	"	0.10	Use (per m ²)
38.	Wood Paint	"	1.0	Use (per door)
39.	Painter Wood W.	"	300	Month
40.	San. Fittings	"	1200	Fixed
41.	Elec. Fittings	"	1450	Fixed
42.	A.C. Tech.	"	300	Month
43.	A.C. Mach.	"	2500	Fixed
44.	Overheads	"	6000	Fixed
45.	Cons. Office	"	3000	Fixed
46.	Contractor	"	10,000	Fixed