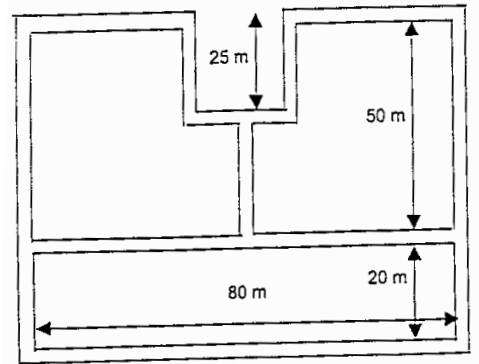


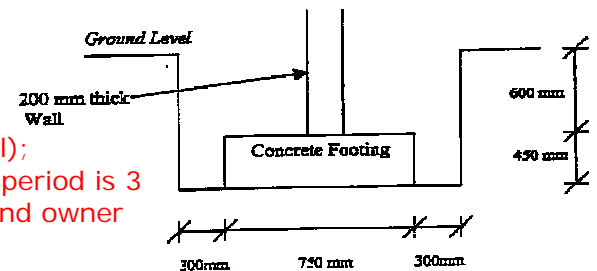
PR 6 – Posted by Dr. Tarek Hegazy, University of Waterloo, tarek@uwaterloo.ca

Description: A foundations subcontractor has been asked to place foundation on a flat site (shown) for a building according to the provided cross-section. The tasks are: excavating trench, placing forms on the trench sides, and then concreting the foundation. The foundation wall is not included in the scope of work.



The subcontractor intends to do the work as follows:

- The Excavation crew works 8 hours per day and uses a 0.29m³ tractor/backhoe;
- The Formwork crew works 8 hours per day, while the Concreting crew works 9 hours per day;
- The Formwork material can be used for two uses;
- The Formwork starts 2 days after start of excavation;
- Concreting will not start before day 14;
- Concrete production is 4.5 m³ per hour;
- The Concrete supplier's quote is \$20,000 (includes material);
- Deadline is 18 days; indirect cost = \$300/day; a reporting period is 3 days and interest rate is 1% per period; markup is 10%; and owner retention is 5% of each invoice; and
- The activities' data can be found in the following table:



022 200 Excav./Backfill/Compact.		CREW	DAILY OUTPUT	MAN-HOURS	UNIT	BARE COSTS				TOTAL INCL O&P	
						MAT.	LABOR	EQUIP.	TOTAL		
0010	EXCAVATING, TRENCH or continuous footing, common earth										
0020	No sheeting or dewatering included										
0050	0.3 m to 1.2 m deep, 0.29 m ³ tractor loader/backhoe	B-11C	115	.139	m ³		3.02	1.74	4.76	6.60	
0060	0.38 m ³ tractor loader/backhoe	B-11M	153	.105	m ³		2.27	1.79	4.06	5.50	
0090	1.2 m to 2 m deep, 0.38 m ³ tractor loader/backhoe		153	.105	m ³		2.27	1.79	4.06	5.50	
0100	0.48 m ³ hydraulic backhoe	B-12Q	191	.084	m ³		1.93	1.98	3.91	5.15	
031 Concrete Formwork											
0010	FORMS IN PLACE, FOOTINGS Continuous wall, 1 use	R031-050	C-1	34.84	.919	m ² CA	12.80	21	.79	34.59	48
0050	2 use			40.88	.783	m ² CA	7	17.70	.67	25.37	36.50
0100	3 use			43.66	.733	m ² CA	5.15	16.55	.63	22.33	32.50
0150	4 use			45.06	.710	m ² CA	4.09	16.05	.61	20.75	30.50
0500	Dowel supports for footings or beams, 1 use			152	211	m	1.74	4.76	.18	6.68	9.55
1000	Integral starter wall, to 100 mm high, 1 use			122	.262	m	3.38	5.95	.23	9.56	13.35

Requirements:

- Manually confirm the calculations in the table.
- Enter this data into EasyPlan and **Check your solution.**

Activity	Quantity	Duration	Cost
Trench Excavation	650 m ³	6	\$3,094
Footing formwork	411 m ² CA	10	\$10,427
Concrete	154 m ³	4	\$20,000