Project Planning and Control Methods

Lecture #9-P2
(Cost Budgeting)

Project Cost Planning

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Outline

- Introduction
- Project cash flow budget
- Control account budget

Introduction

- Cost budgeting is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized *Cost Baseline*.
- Project cost budget determines how much money we are going to spend in the project over the course of the time! It also shows the source of these expenditures!
- The main inputs of cost budgeting are: Scope statement, WBS dictionary, schedule baseline and cost estimation.
- Cost baseline is used as a guideline for the project manager to be prepared for the upcoming project costs as well as monitoring project cost performance.
- The authorized budget baseline gives us project cost information in two main directions:
  - Makes us able of tracking the project's cash-flow over time; how much cost/ income to expect over time. This is done by project cost and income aggregation within manageable time steps (e.g., monthly, weekly or daily basis) over the course of the project.
  - Gives us measure to track cost performance in different parts of the project. This is done by setting project control accounts (or project cost centers) on manageable project parts and aggregating activity cost estimations under each control account.

Project cash flow budget

- Project cash-flow budget represent the resultant of the cash you *expect* to *receive* (inflow) and *spend (outflow)* within manageable time steps over the course of project

  A sample example of the monthly cash flow of a project with 7 month of duration looks like:

	Month						
	1	2	3	4	5	6	7
Total cost spent (out-flow)$	100	150	180	200	120	100	40
Total income received (in-flow)$	300			300			500
Project Cash flow (total inflow - total outflow)$	**200**	**-150**	**-180**	**100**	**-120**	**-100**	**460**

- Project cash flow budget:
  - Helps us to understand and plan for likely ups and downs in your cash flow
  - Gives us an important indicator of maximum cash in hand required

  In our last example maximum cash in hand required is 250$ which is calculated by using cumulative cash flow:

Project cash flow budget

	Month						
	1	2	3	4	5	6	7
Total cost spent (out-flow)$	100	150	180	200	120	100	40
Total income received (in-flow)$	300			300			500
Project Cash flow (total inflow - total outflow)$	**200**	**-150**	**-180**	**100**	**-120**	**-100**	**460**
Cumulative Project Cash flow $	**200**	**50**	**-130**	**-30**	**-150**	**-250**	**210**

- Allows us to make informed decisions when planning additional expenditure
- Shows your financer (or bank) that you're managing your project financial aspects, and whether you can afford additional borrowings.

- Two key information for developing the project cash flow budgets are *activity cost estimations* over time steps (forms the out-flow) (is developed from cost estimation and schedule) and project client's payments structure (forms the in-flow) (is extracted from the project contract and is highlighted in the *scope statement*)
- Compared to the number of project activity cost items (out-flow), usually number of payments (from client) (in-flow) are few. So usually our main focus on cash flow development goes to the project *out-flow*.

Project cash flow budget

- **Example 1**: Baseline schedule and estimated cost of our foundation formwork is:

WBS	Task Name	Cost	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013	21/04/2013
3.1.1	Extract foundation sizes from drawings	$160.00																
3.1.2	Order form sheets required	$480.00																
3.1.3	Hire two form-workers for the job	$80.00																
3.1.4	Size the form-sheets	$240.00																
3.1.5	Install form-sheets in place	$480.00																

Project cash flow budget

- **Example 1**: Baseline schedule and estimated cost of our foundation formwork is:

WBS	Task Name	Cost	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013	21/04/2013
3.1.1	Extract foundation sizes from drawings	$160.00																
3.1.2	Order form sheets required	$480.00																
3.1.3	Hire two form-workers for the job	$80.00																
3.1.4	Size the form-sheets	$240.00																
3.1.5	Install form-sheets in place	$480.00																

The outflow of the project is going to be:

WBS	Task Name	Cost	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013	21/04/2013
3.1.1	Extract foundation sizes	$160.00	160															
3.1.2	Order form sheets	$480.00		480														
3.1.3	Hire two form-workers	$80.00	80															
3.1.4	Size the form-sheets	$240.00					60	60	60	60								
3.1.5	Install form-sheets in	$480.00										80	80	80	80	80		80
Outflow			**240**	**480**	**0**	**0**	**60**	**60**	**60**	**60**	**0**	**80**	**80**	**80**	**80**	**80**	**0**	**80**

Project cash flow budget

- **Example 1 (cont'd)**: Client is going to pay $400 when the work starts and $1600 when the work is completed. The cash flow of the project is going to be:

WBS	Task Name	Cost	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013	21/04/2013	22/04/2013
3.1.1	Extract foundation sizes from drawings	$160.00	160																
3.1.2	Order form sheets required	$480.00		480															
3.1.3	Hire two form-workers for the job	$80.00	80																
3.1.4	Size the form-sheets	$240.00					60	60	60	60									
3.1.5	Install form-sheets in place	$480.00										80	80	80	80	80		80	
Outflow			**240**	**480**	**0**	**0**	**60**	**60**	**60**	**60**	**0**	**80**	**80**	**80**	**80**	**80**	**0**	**80**	
Inflow			**400**																**1600**
Cash flow= Inflow - Outflow			**160**	**-480**	**0**	**0**	**-60**	**-60**	**-60**	**-60**	**0**	**-80**	**-80**	**-80**	**-80**	**-80**	**0**	**-80**	**1600**
Cumulative Cash Flow			**160**	**-320**	**-320**	**-320**	**-380**	**-440**	**-500**	**-560**	**-560**	**-640**	**-720**	**-800**	**-880**	**-960**	**-960**	**-1040**	**560**

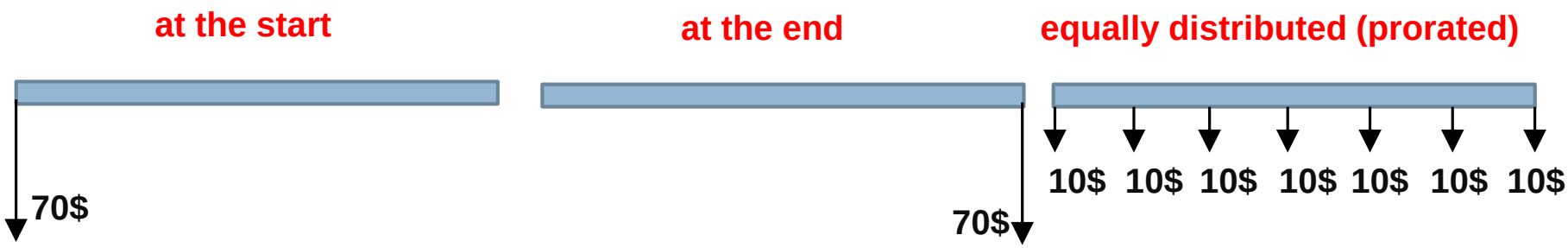
In class practice 1

Project activities of a project have been calculated as in table in below. The contractor has won the project at the price of 250 MT. Client will pay 20% of the project cost as down payment in advance; 20% cost of the project will be paid after the completion of the activity C; and the rest of the project price will be paid at the end of the project. Calculate the cash flow of the project! What is going to be the maximum cash in hand required?

Task Name	1	2	3	4	5	6	7	8	9	10	11	Cost (MT)
A												$80.00
B												$32.00
C												$40.00
D												$36.00
E												$60.00

Project cash flow budget

- Basic activity cost spending forms (are supported by scheduling programs):



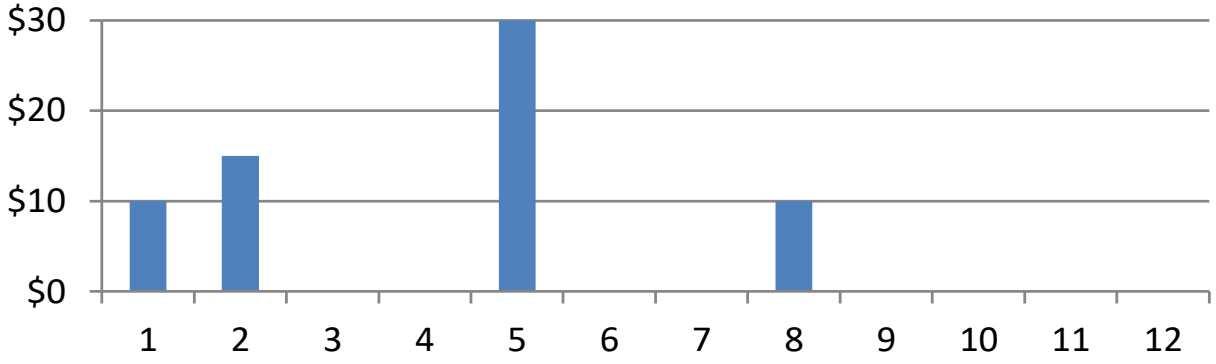
  - A conservative out-flow can be developed by assuming all activity costs “at the start” of project activities.
  - An optimistic out- flow can be developed by assuming all activity costs “at the end” of project activities.
  - In reality different project activities fall under different forms of cost spending! However, usually the resultant out-flow stays somewhere in between conservative and optimistic out-flow.

Project cash flow budget

- **Example 2:** Table in below presents a conservative out-flow calculation for the given set of activities:

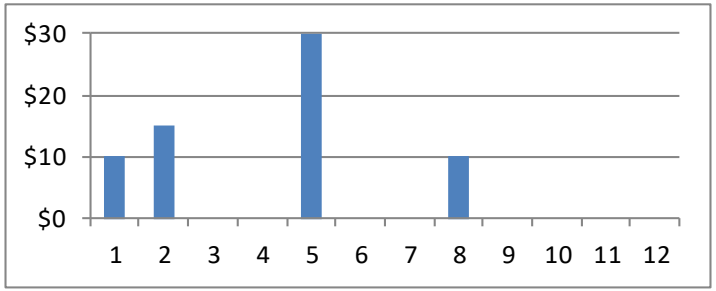
Coservative out-flow development

Activity	Start	Finish	Cost	1	2	3	4	5	6	7	8	9	10	11	12
A	1	3	$10	10											
B	2	7	$15		15										
C	5	9	$10					10							
D	5	10	$20					20							
E	8	12	$10								10				
Out-flow			$65	$10	$15	$0	$0	$30	$0	$0	$10	$0	$0	$0	$0



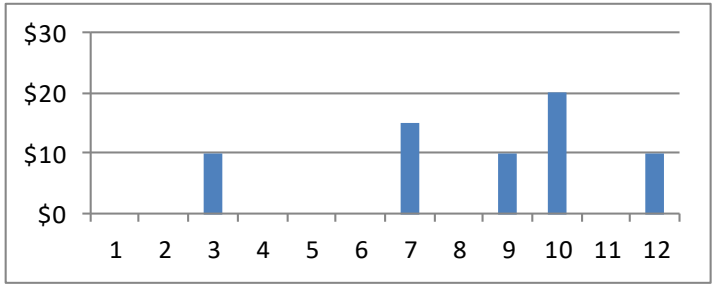
Coservative out-flow development

Activity	Start	Finish	Cost	1	2	3	4	5	6	7	8	9	10	11	12
A	1	3	$10	10											
B	2	7	$15		15										
C	5	9	$10					10							
D	5	10	$20					20							
E	8	12	$10								10				
Out-flow			$65	$10	$15	$0	$0	$30	$0	$0	$10	$0	$0	$0	$0



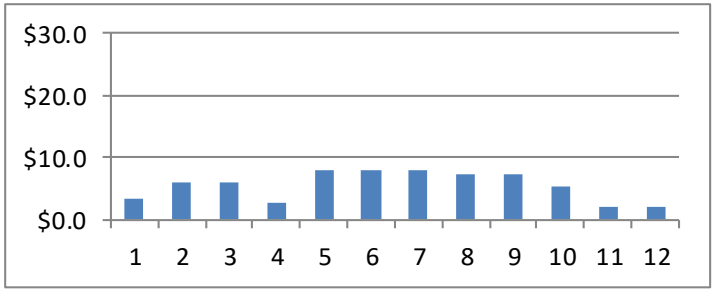
Optimistic out-flow development

Activity	Start	Finish	Cost	1	2	3	4	5	6	7	8	9	10	11	12
A	1	3	$10			10									
B	2	7	$15							15					
C	5	9	$10									10			
D	5	10	$20										20		
E	8	12	$10												10
Out-flow			$65	$0	$0	$10	$0	$0	$0	$15	$0	$10	$20	$0	$10



Equally distributed out-flow development

Activity	Start	Finish	Cost	1	2	3	4	5	6	7	8	9	10	11	12
A	1	3	$10	3.3	3.3	3.3									
B	2	7	$15		2.5	2.5	2.5	2.5	2.5	2.5					
C	5	9	$10					2.0	2.0	2.0	2.0	2.0			
D	5	10	$20					3.3	3.3	3.3	3.3	3.3	3.3		
E	8	12	$10								2.0	2.0	2.0	2.0	2.0
Out-flow			$65	$3.3	$5.8	$5.8	$2.5	$7.8	$7.8	$7.8	$7.3	$7.3	$5.3	$2	$2

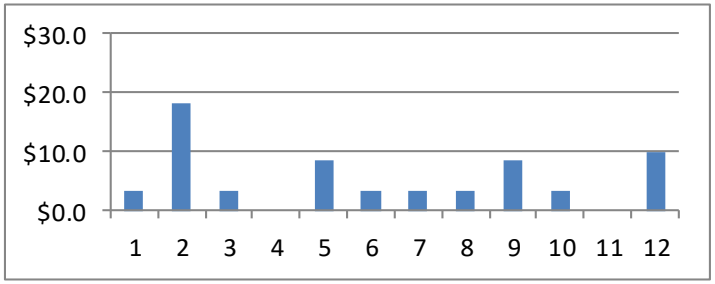


A combined-form out-flow development

Activity	Start	Finish	Cost	1	2	3	4	5	6	7	8	9	10	11	12
A	1	3	$10	3.3	3.3	3.3									
B	2	7	$15		15.0										
C	5	9	$10					5.0				5.0			
D	5	10	$20					3.3	3.3	3.3	3.3	3.3	3.3		
E	8	12	$10												10
Out-flow			$65	$3.3	$18.3	$3.3	$0	$8.3	$3.3	$3.3	$3.3	$8.3	$3.3	$0	$10

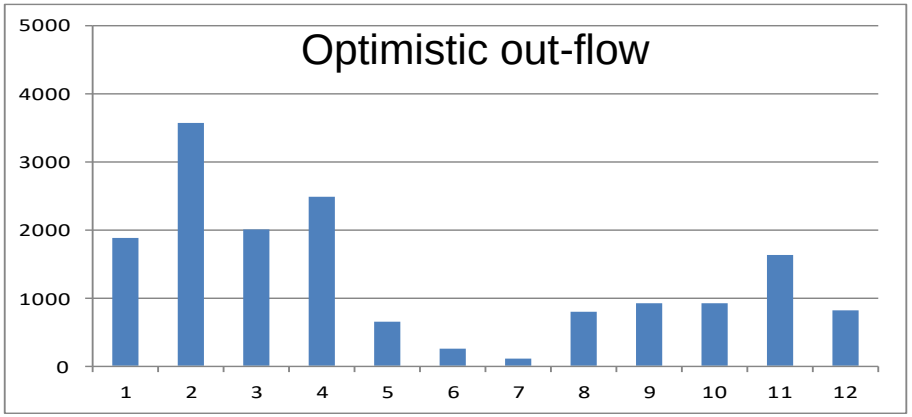
50% at the start

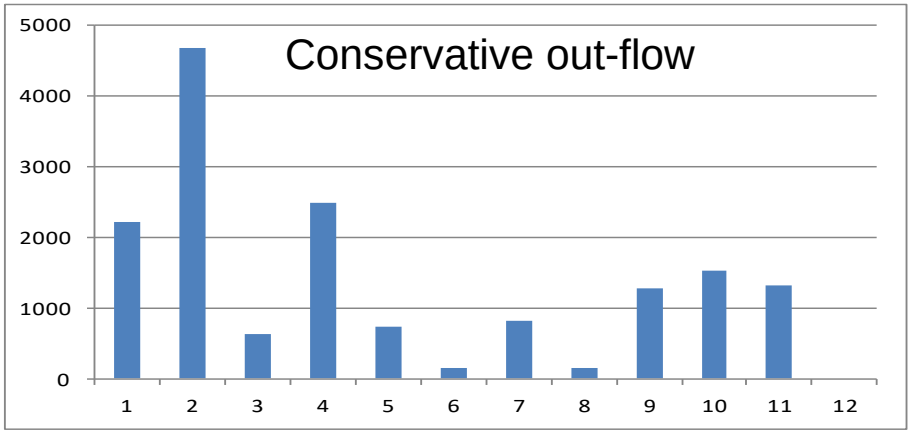
50% at the end



Project cash flow budget

- **Example 3**: A sample comparison between conservative and optimistic out-flow in a ***12 month*** project with ***100 activities***:





As it is seen in the diagrams, compared to the last example's out-flow diagrams, when number of activities within the project gets increased, the difference between conservative and optimistic out-flow is decreased.

Project cash flow budget

- In addition to the activity costs, we need to consider *Cost Contingency* as an out-flow of the project. Cost contingency is charged over the course of the project proportional to the periodical activity cost spent or even in equal values.
- Development and analysis of cash flow budget for *real projects* in the industry is usually done by using a combination of scheduling programs, spreadsheets and/or other auxiliary programs.
- **Example 4**: In our “Prepare foundation formwork” project, suppose the contractor company has won the project with total cost of 2,000 TT (2MT). The baseline schedule development is as follows:

	WB	Task Name	Duratic	Baseline Start	Baseline Finish	Predecessor	Resource Names
1	3.1.1	Extract foundation sizes from drawings	1 day	Sat 06/04/13	Sat 06/04/13		Eng
2	3.1.2	Order form sheets required	1 day	Sun 07/04/13	Sun 07/04/13	1	Pu
3	3.1.3	Hire two form-workers for the job	1 day	Sat 06/04/13	Sat 06/04/13		HR
4	3.1.4	Size the form-sheets	1 day	Wed 10/04/13	Sat 13/04/13	3FS+3 days,2	FW[200%]
5	3.1.5	Install form-sheets in place	2 days	Mon 15/04/13	Sat 20/04/13	4SS+1 day	FW[200%]

Project cash flow budget

- **Example 4 (cont'd)**:

  Part 1: Processing data in our scheduling program (MS Project in our case):

  In our schedule development process we linked some resources (usually shared and non-expendable resources) to the project activities. These are the *resources which have contributed to our schedule* development process. After estimating our activity costs, we need to directly write down their related cost rates under schedule Resource Sheet.

Resource Name	Type	Materi: Label	Initial	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At
Eng	Work		E	100%	$20.00/hr	$30.00/hr	$0.00	Start
Pu	Work		P	100%	$10.00/hr	$15.00/hr	$0.00	Start
HR	Work		H	100%	$10.00/hr	$15.00/hr	$0.00	Start
FW	Work		F	200%	$15.00/hr	$22.50/hr	$0.00	Start

Start
Prorated
End

Cost spending form

We need to directly link all direct costs spent for every activity (e.g., costs in addition to the cost of shared resources contributed to our schedule development) to the activity. This can be done by either **1)** defining an specific material type resource for the activity or **2)** directly adding this cost as a direct fixed cost for the activity!

Project cash flow budget

- **Example 4 (cont'd)**:

  The only direct cost we estimated and is out of the in-schedule-resources is "100 m^2 form sheets" with total cost of 400TT. This is spent in activity 3.1.2 (Order form sheets required). We need to apply this cost directly to the activity.

  Option 1) We can define a new material resource for the activity:

The cost of 100 m2 form sheets is added as a material type cost of activity 3.1.2 in the Resource Sheet

Resource	Type	Material Label	Initial	Max.	Std. Rate	Ovt. Rate	Cost/Use
Eng	Work		E	100%	$20.00/hr	$30.00/hr	$0.00
Pu	Work		P	100%	$10.00/hr	$15.00/hr	$0.00
HR	Work		H	100%	$10.00/hr	$15.00/hr	$0.00
FW	Work		F	200%	$15.00/hr	$22.50/hr	$0.00
Ac_3.1.2	Material	Form sheets 100 m2	A		$400.00		$0.00

This new resource is linked to its related activity

WB	Task Name	Duratic	Baseline Start	Baseline Finish	Predecessor	Resource Names
3.1.1	Extract foundation sizes from drawings	1 day	Sat 06/04/13	Sat 06/04/13		Eng
3.1.2	Order form sheets required	1 day	Sun 07/04/13	Sun 07/04/13	1	Pu,Ac_3.1.2[1 Form sheets 100 m2]
3.1.3	Hire two form-workers for the job	1 day	Sat 06/04/13	Sat 06/04/13		HR
3.1.4	Size the form-sheets	1 day	Wed 10/04/13	Sat 13/04/13	3FS+3 days,2	FW[200%]
3.1.5	Install form-sheets in place	2 days	Mon 15/04/13	Sat 20/04/13	4SS+1 day	FW[200%]

Project cash flow budget

- **Example 4 (cont'd)**:

  The scheduling program calculates the total cost of each activity under a cost field (you can insert into your schedule).

WB	Task Name	Duratic	Baseline Start	Baseline Finish	Predecessor	Resource Names	Cost
3.1.1	Extract foundation sizes from drawings	1 day	Sat 06/04/13	Sat 06/04/13		Eng	$160.00
3.1.2	Order form sheets required	1 day	Sun 07/04/13	Sun 07/04/13	1	Pu,Ac_3.1.2[1 Form sheets 100 m2]	$480.00
3.1.3	Hire two form-workers for the job	1 day	Sat 06/04/13	Sat 06/04/13		HR	$80.00
3.1.4	Size the form-sheets	1 day	Wed 10/04/13	Sat 13/04/13	3FS+3 days,2	FW[200%]	$240.00
3.1.5	Install form-sheets in place	2 days	Mon 15/04/13	Sat 20/04/13	4SS+1 day	FW[200%]	$480.00

OR Option 2) Set this cost as a fixed cost for the activity:

	WBS	Task Name	Duratio	Baseline Start	Baseline Finish	Predecessors	Resource Names	Fixed Cost	Cost
1	3.1.1	Extract foundation sizes from drawings	1 day	Sat 06/04/13	Sat 06/04/13		Eng	$0.00	$160.00
2	3.1.2	Order form sheets required	1 day	Sun 07/04/13	Sun 07/04/13	1	Pu	$400.00	$480.00
3	3.1.3	Hire two form-workers for the job	1 day	Sat 06/04/13	Sat 06/04/13		HR	$0.00	$80.00
4	3.1.4	Size the form-sheets	1 day	Wed 10/04/13	Sat 13/04/13	3FS+3 days,2	FW[200%]	$0.00	$240.00
5	3.1.5	Install form-sheets in place	2 days	Mon 15/04/13	Sat 20/04/13	4SS+1 day	FW[200%]	$0.00	$480.00

Project cash flow budget

- **Example 4 (cont'd)**:

  We have now our activity costs linked to the baseline schedule!

  Part 2: Processing data in spreadsheet (MS Excel in our case)

  Export (copy and paste) schedule and cost information into the spreadsheet so that you can develop cash flow.

WBS	Task Name	Baseline Start	Baseline Finish	Cost
3.1.1	Extract foundation sizes from drawings	2013-04-06	2013-04-06	$160.00
3.1.2	Order form sheets required	2013-04-07	2013-04-07	$480.00
3.1.3	Hire two form-workers for the job	2013-04-06	2013-04-06	$80.00
3.1.4	Size the form-sheets	2013-04-10	2013-04-13	$240.00
3.1.5	Install form-sheets in place	2013-04-15	2013-04-20	$480.00

You need then to have your time intervals (can be weeks, months and in this example days) as headings. By using a simple Excel formula (e.g., using SUMIFs function) you can extract costs occur during a specific time interval!

Project cash flow budget

- **Example 4 (cont'd)**:

  It is possible to develop either conservative or optimistic cost spending forms

Project direct cost out-flow

	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013
Coservative Cost (TT)	240	480	0	0	240	0	0	0	0	480	0	0	0	0	0
Coservative Cumulative (TT	240	720	720	720	960	960	960	960	960	1440	1440	1440	1440	1440	1440
Optimistic Cost (TT)	240	480	0	0	0	0	0	240	0	0	0	0	0	0	480
Optimistic Cumulative (TT)	240	720	720	720	720	720	720	960	960	960	960	960	960	960	1440

Question: What else do we need to consider for the project out-flow?

Project cash flow budget

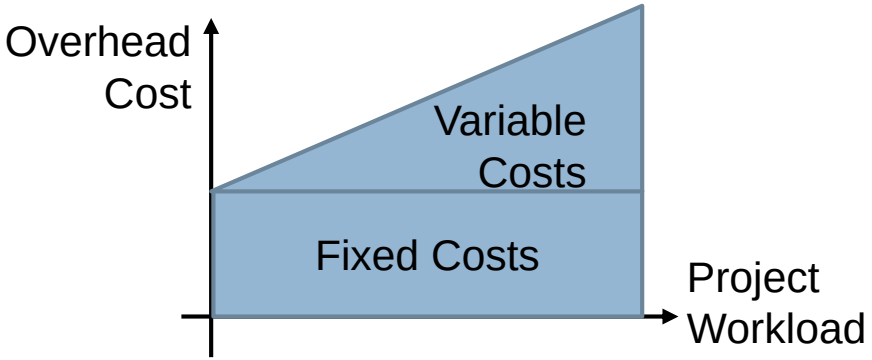
- **Example 4 (cont'd)**:
  - We also need to consider cost contingencies in our project's out-flow. Since cost contingency is not usually linked to specific activity (but group of activities) and is calculated for the project as a total we need to divide it among the time periods we have!
  - In our case we have considered10% of contingency and divided them equally (for the sake of simplicity) among different periods:

	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013
Coservative Cost (TT)	240	480	0	0	240	0	0	0	0	480	0	0	0	0	0
Coservative Cumulative (TT)	240	720	720	720	960	960	960	960	960	1440	1440	1440	1440	1440	1440
Cost Contingency (10%) (TT)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Contingency Cumulative (TT)	9.6	19.2	28.8	38.4	48	57.6	67.2	76.8	86.4	96	105.6	115.2	124.8	134.4	144
Total direct costs (TT)	**250**	**490**	**9.6**	**9.6**	**250**	**9.6**	**9.6**	**9.6**	**9.6**	**490**	**9.6**	**9.6**	**9.6**	**9.6**	**9.6**
Total cumulative direct costs (TT)	**250**	**739**	**749**	**758**	**1008**	**1018**	**1027**	**1037**	**1046**	**1536**	**1546**	**1555**	**1565**	**1574**	**1584**

Question: What else do we need to consider for the project out-flow?

Project cash flow budget

- **Example 4 (cont'd)**:
  - Indirect costs including Project Overhead Costs and General and Administrative Costs are parts of actual project cost.
  - General Administrative Costs are usually considered as a part of company's costs and are not entered in the project cash flow.
  - We might be able to directly calculate some major portions of the *Project Overhead Costs* such as project manager and some of supporting staff salaries and project's office rental costs. But most project overhead costs are difficult to directly calculate in advance; we are usually going to estimate a percentage for them based on past experiences.
  - In regard to the project workload, project overhead costs have both fixed portions (such as project manager salary and project office rental costs) and variable portions (such as utility costs, project supplies costs and some supporting staff).



Project cash flow budget

- **Example 4 (cont'd)**:
  - It is ideal to equally divide fixed portion of the overhead costs and divide variable costs proportional to the project workload. However, it is usually difficult to separate fixed and variable overhead costs!
  - We usually divide overhead costs equally over the course of the project.
  - In our case (for the sake of simplicity) we have considered overhead costs as 5% of direct costs and divided them equally among different periods:

	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013
Coservative Cost (TT)	240	480	0	0	240	0	0	0	0	480	0	0	0	0	0
Coservative Cumulative (TT)	240	720	720	720	960	960	960	960	960	1440	1440	1440	1440	1440	1440
Cost Contingency (10%) (TT)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Contingency Cumulative (TT)	9.6	19.2	28.8	38.4	48	57.6	67.2	76.8	86.4	96	105.6	115.2	124.8	134.4	144
Total direct costs (TT)	**250**	**490**	**9.6**	**9.6**	**250**	**9.6**	**9.6**	**9.6**	**9.6**	**490**	**9.6**	**9.6**	**9.6**	**9.6**	**9.6**
Total cumulative direct costs (TT)	**250**	**739**	**749**	**758**	**1008**	**1018**	**1027**	**1037**	**1046**	**1536**	**1546**	**1555**	**1565**	**1574**	**1584**
Overhead Cost (5%) (TT)	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28
Overhead Cumulative (TT)	5.28	10.6	15.8	21.1	26.4	31.7	37	42.2	47.5	52.8	58.08	63.36	68.64	73.92	79.2
Total cumulative cost (TT)	**255**	**495**	**15**	**15**	**255**	**15**	**15**	**15**	**15**	**495**	**15**	**15**	**15**	**15**	**15**
Total cumulative cost (TT)	**255**	**750**	**765**	**780**	**1034**	**1049**	**1064**	**1079**	**1094**	**1589**	**1604**	**1619**	**1633**	**1648**	**1663**

Project cash flow budget

- **Example 4 (cont'd)**:

  Wrapping up time periods: We usually handle project cash flow (e.g., reconcile accounts, cash cheques, draw cheques, pay salaries) on periodical basis (e.g., weekly, bi-weekly, or monthly basis). Money to be spent at a period needs to be accounted for at the beginning of the period! Money has been received during a period can be accounted for the coming period! For example in our case we get money for the project on *weekly* basis and we have the out-flow as:

	06/04/2013	07/04/2013	08/04/2013	09/04/2013	10/04/2013	11/04/2013	12/04/2013	13/04/2013	14/04/2013	15/04/2013	16/04/2013	17/04/2013	18/04/2013	19/04/2013	20/04/2013
Total outflow daily (TT)	**255**	**495**	**15**	**15**	**255**	**15**	**15**	**15**	**15**	**495**	**15**	**15**	**15**	**15**	**15**
Total outflow weekly (Cons'v) (TT)	**1064**							**584**							**15**

Note: You need to sum all costs spend during a period up to start of the period!

For completing our cash flow we need to also determine our in-flows. In our case suppose the client gives 30% of the our 2000TT before the works starts and the rest of the money at the end of the project. The cash flow will be:

Project cash flow budget

- **Example 4 (cont'd)**:

Note: To be on the safe side you *might* need to consider all in-flows occurred within a period at the start of the next period!

	06/04/2013	12/04/2013	20/04/2013	21/04/2013
Total Out-flow (Cons'v) (TT) A	**1064**	**584**	**14.9**	
Cumulative Out-flow (TT) B	**1064**	**1648**	**1663**	**1663**
Total In-flow (Cons'v) (TT) C	**600**			**1400**
Cumulative in-flow (TT) D	**600**	**600**	**600**	**2000**
Cash flow (TT) (C-A)	**-464**	**-584**	**-15**	**1400**
Cumulative cash flow (TT) (D-B)	**-464**	**-1048**	**-1063**	**337**

According to the project cash flow we need to prepare total cash in hand of 1063TT to be able to run the project.

Note: Cash flow calculations contain many details which are mainly discussed in engineering economics and in real projects you might need to consider those details. However, in this course we do not enter in this area!

In class practice 2

Project activities of a project have been calculated as in table in below. The contingency cost of the project is considered 15% (equally divided over the course of the project). There is estimated an overhead cost of 5% from start to the end of project. The contractor has won the project at the (net) rate of 250 MT. Client will pay 20% of the project cost in advance. 20% cost of the project will be paid after the completion of the activity C. Conservatively calculate the project cost on **monthly basis** and see if the contractor needs to have any cash in hand for the project. If yes, what is the maximum value contractor needs?

Task Name	Baseline Start	Baseline Finish	Cost (MT)
A	2013-05-01	2013-07-06	$30.00
B	2013-06-07	2013-07-09	$30.00
C	2013-06-20	2013-09-06	$40.00
D	2013-08-10	2013-09-13	$35.00
E	2013-07-15	2013-10-20	$50.00

In class practice 3

Project activities of a project have been calculated as in table in below. The contingency cost of the project is considered 10% (proportional to the periodical cost). In addition to the project manager salary with the weekly rate 1MT, there is an overhead cost of 10% estimated for the project. The contractor has won the project at the (net) rate of 30 MT. Client will pay 30% of the project cost in advance. 20% cost of the project will be paid after the completion of the activity B. Optimistically calculate the project costs on **weekly basis** and see if the contractor needs to have any cash in hand for the project. If yes, what is the maximum value contractor needs? (the project starts at Saturday Jun 4th, 2013; working week is from Saturday to Friday).

Task Name	Baseline Start	Baseline Finish	Cost (MT)
A	2013-06-04	2013-06-13	$5.00
B	2013-06-07	2013-06-14	$6.00
C	2013-06-10	2013-06-18	$2.00
D	2013-06-15	2013-06-25	$5.00
E	2013-06-16	2013-06-28	$5.00

Control account budget

- Control accounts (CA) are manageable points on the WBS of the project which are higher levels of WBS set *above* activity or work package levels. Estimated activity/ work package costs are *aggregated* at the control account level in each WBS branch to develop the budgeted cost. Later on during the control process, actual project costs are accumulated under these control accounts and project cost performance is calculated at the control account level of the WBS to be controlled!
- **Example**: A six storey building construction (see the file attached).

A possible control account for the project (lower level WBS items crossed)

1. Planning
   - ~~1.1. Scope planning~~
   - ~~1.2. Time planning~~
   - ~~1.3. Cost planning~~
   - ~~1.4. Human resource planning~~
2. Construction permits
   - ~~2.1. Listing construction permits required~~
   - ~~2.2. Applying for the permits~~
   - ~~2.3. Following up until permits are issued~~
3. Mobilization
   - ~~3.1. Hiring initial crew required~~
   - 3.2. Moving and installing onsite trailers (for onsite office and security)

Control account budget

- This truncated (shortened) WBS, which is stopped at the cost control account levels in each branch, forms the project's ***cost breakdown structure (CBS)***.
- Completed project cash flow and control account budget form the ***project cost baseline***!
- Project baselines (including scope, time and cost baseline) are distributed among project members in different parts of the project to be used as guidelines and road maps for them. At their lowest level, project baselines work as checklists for the project members to follow their assigned activities in order and to adjust their pace based on them. Furthermore, they can see the relation of their work to other parts of the project and do proper prearrangements and coordination with them to run a smooth project!

Thank you!