Assignment: Project Planning & Finance June 2016

The directors of a pharmaceutical company have decided to launch a revised version of an existing medicine.
Some work has been done on estimating the essential components of the process and the following information is available.

There will be an internal review involving all affected departments estimated to last for 8 weeks.
Following this, work on completing the ingredient formula can commence and this is estimated to take 12 weeks.
On completion, the final product specification can be confirmed –estimated time for this is 4 weeks.
As soon as the formulation is completed (even though final product specification still has to be done) regulatory documentation can be prepared and filed –this will take 3 weeks
and confirmation of approval will be a further 4 weeks.

When the product specification is complete procurement of ingredients and packaging can commence—estimated time is 2 weeks to complete negotiations and place orders,
with a further 1 week for delivery of all orders placed.

Also following the completion of product specification the setting up of the production processes will take place-estimated time 4 weeks.

Packaging design taking 2 weeks can commence anytime following the internal review but the preparation and printing of PILs (estimated time 1 week) must await receipt of regulatory approval.

There will be a full test run of producing and packaging the product when all above is complete and 3 weeks has been allowed for this.

Following the internal review the following people will work on the various processes:

Formulation:—	**Joe, Mary, Tom**	**J M T**
Documentation:-	**Joe, Michael**	**J Mi**
Specification:-	**Joe, Tom, Jane**	**J T Ja**
Procurement:-	**Tom, Sarah**	**T S**
Production set up:-	**Brian, Bill**	**Br Bi**
Packaging Design:-	**Richard**	**Ri**
PILs	**Tom**	**T**
Testing	**Brian, Bill**	**Br Bi**

Everybody except Tom is paid at the rate of € 600 per week; Tom is paid € 800

Task 1: **Create a precedence table and work breakdown sheet -10 /30**

Task 2: **Draw a network diagram—identify any burst or merge points 10 /30**

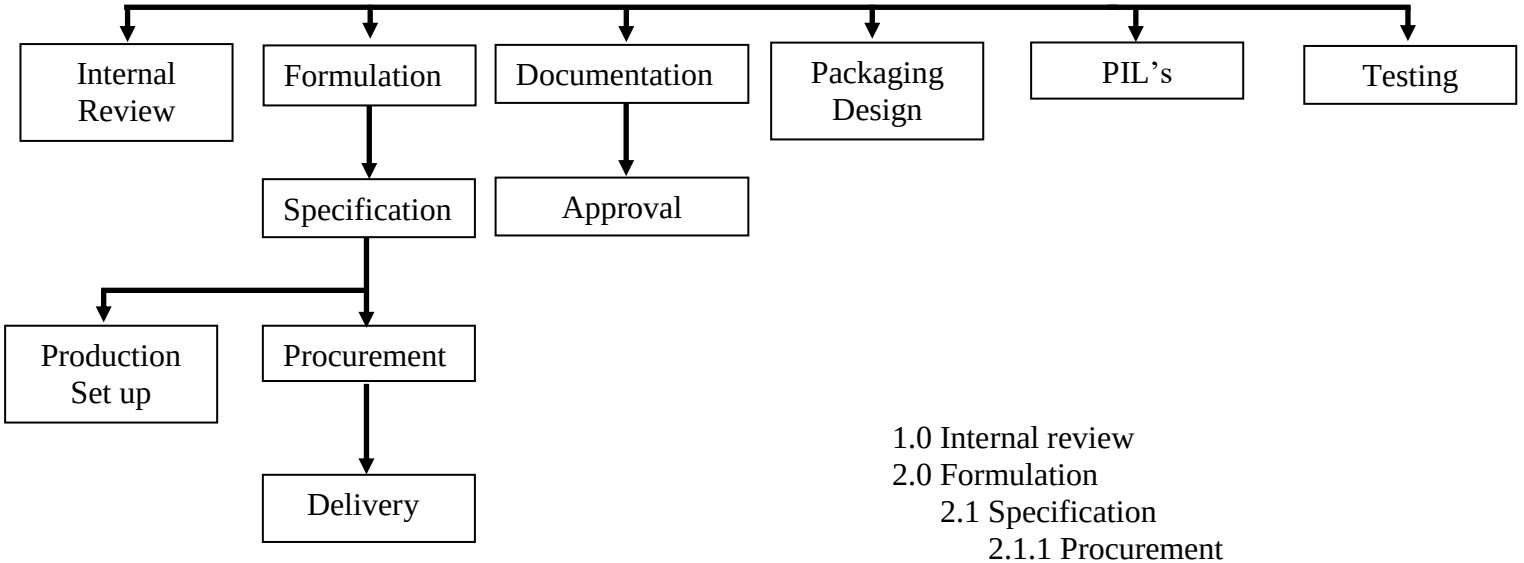
Task 3: **Calculate the total labour cost of this project. 4/30**

Task 4: **22 weeks from day 1 you are told that there must be a labour cost saving of 20%. Outline options to achieve this—and suggest a plan with reasons for your decisions. Make and explain any assumptions that you would find helpful (but not essential to do this) 6/30**

Assignment: Project Planning & Finance 17'th July 2016

Work breakdown sheet

Medicine Revision

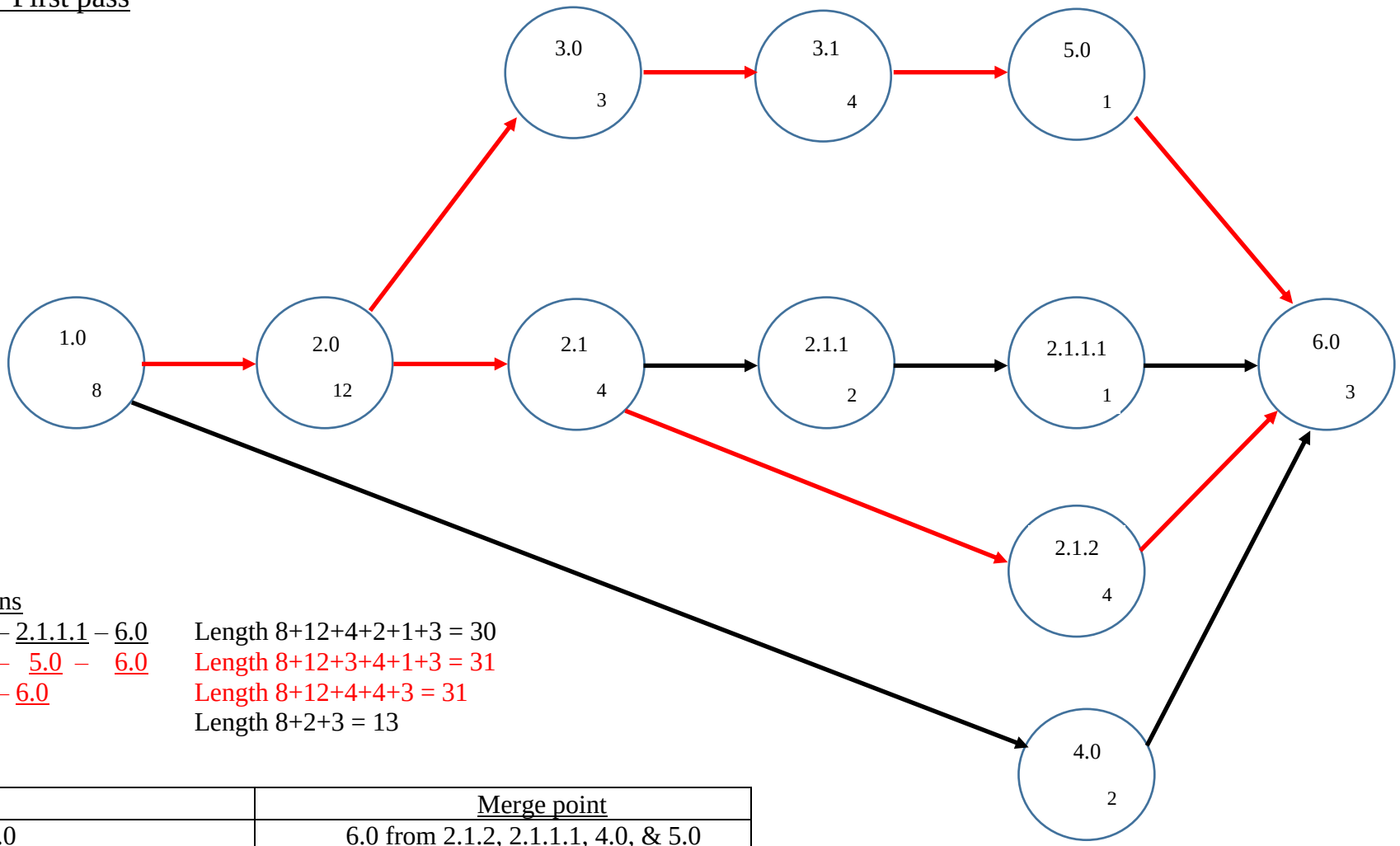


1.0 Internal review
2.0 Formulation
    2.1 Specification
        2.1.1 Procurement
            2.1.1.1 Delivery
        2.1.2 Production set up
3.0 Documentation
    3.1 Approval
4.0 Packaging Design
5.0 PIL's
6.0 Testing

Precedence Table

Description	People	Activity	Immediate Predecessors	Duration weeks
Internal Review	-	1.0	-	8
Formulation	Joe, Mary & Tom	2.0	1.0	12
Specification	Joe, Jane & Tom	2.1	2.0	4
Documentation	Joe, Michael	3.0	2.0	3
Approval	-	3.1	3.0	4
Procurement	Tom, Sarah	2.1.1	2.1	2
Delivery	-	2.1.1.1	2.1.1	1
Production set up	Brian, Bill	2.1.2	2.1	4
Packaging Design	Richard	4.0	1.0	2
PILS	Tom	5.0	3.1	1
Testing	Brian, Bill	6.0	2.1.1.1, 2.1.2, 4.0, 5.0	3

Network Diagram – First pass



Critical path calculations

1.0 – 2.0 – 2.1 – 2.1.1 – 2.1.1.1 – 6.0	Length 8+12+4+2+1+3 = 30
1.0 – 2.0 – 3.0 – 3.1 – 5.0 – 6.0	Length 8+12+3+4+1+3 = 31
1.0 – 2.0 – 2.1 – 2.1.2 – 6.0	Length 8+12+4+4+3 = 31
1.0 – 4.0 – 6.0	Length 8+2+3 = 13

Burst points	Merge point
1.0 to 2.0 & 4.0	6.0 from 2.1.2, 2.1.1.1, 4.0, & 5.0
2.0 to 2.1 & 3.0	
2.1 to 2.1.1 & 2.1.2	

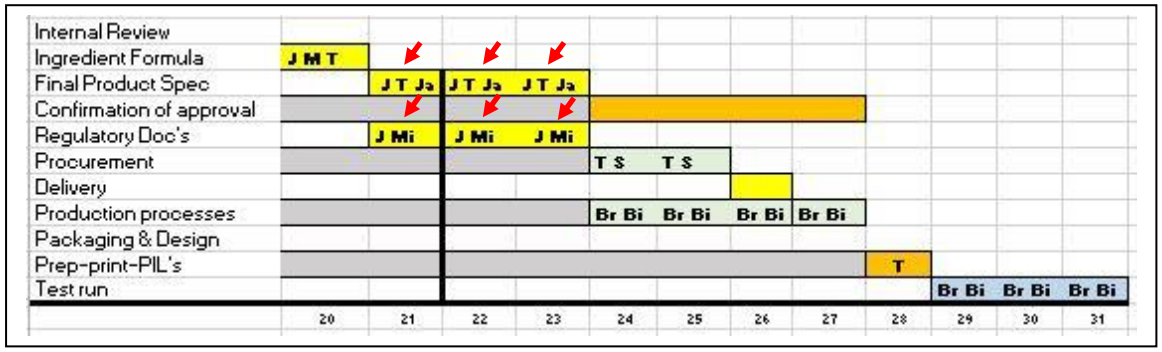
Assumptions

Assuming no of hours per person, per week is	40
Normal working day	8
Maximum hours per day	12
Labour cost per week for Tom	€ 800
Labour cost per hour Tom	€ 20
Labour cost per week everyone else	€ 600
Labour cost per hour everyone else	€ 15

Total project cost €48,800

	No of weeks	No of people	Total time in hours	Ordinary cost	Tom cost	People
Internal Review (Estimated)	8	0	0	0		
Formulation (Estimated)	12	3	1440	14400	9600	Joe Mary Tom
Documentation	3	2	240	3600		Joe Michael
Approvals	4	-	-	-		-
Specification (Estimated)	4	3	480	4800	3200	Joe Tom Jane
Procurement (Estimated)	2	2	160	1200	1600	Tom Sarah
Delivery	1	-	-	-		-
Production set up (Estimated)	4	2	320	4800		Brian Bill
Packaging design	2	1	80	1200		Richard
PIL's (Estimated)	1	1	40		800	Tom
Testing (Estimated)	3	2	240	3600		Brian Bill
		Total	48800	33600	15200	

Two critical paths exist, however the Gant chart below reveals a resource constraint. Joe is scheduled to work on 40 hours Documentation and 40 hours Specification which is not possible. Reasonable expected overtime would be a 12 hour day for a restricted period of time.

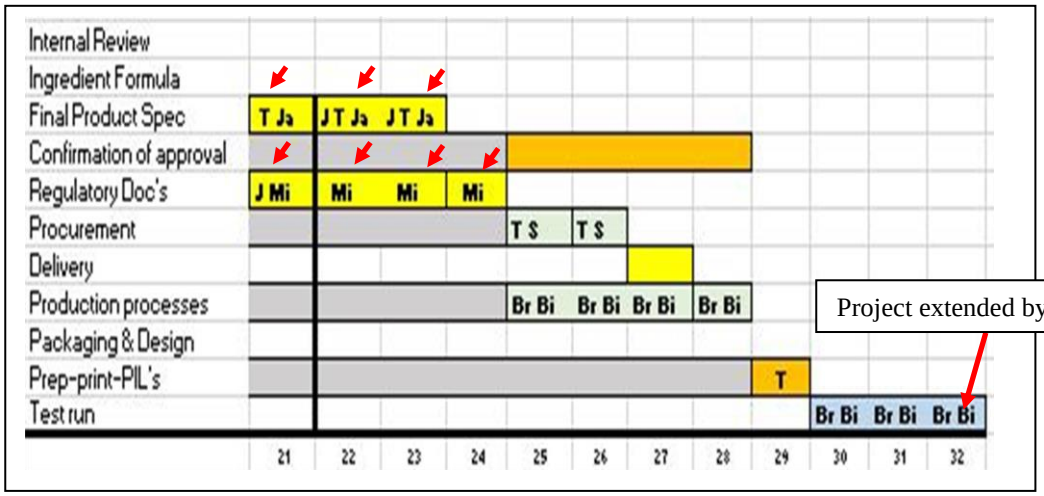


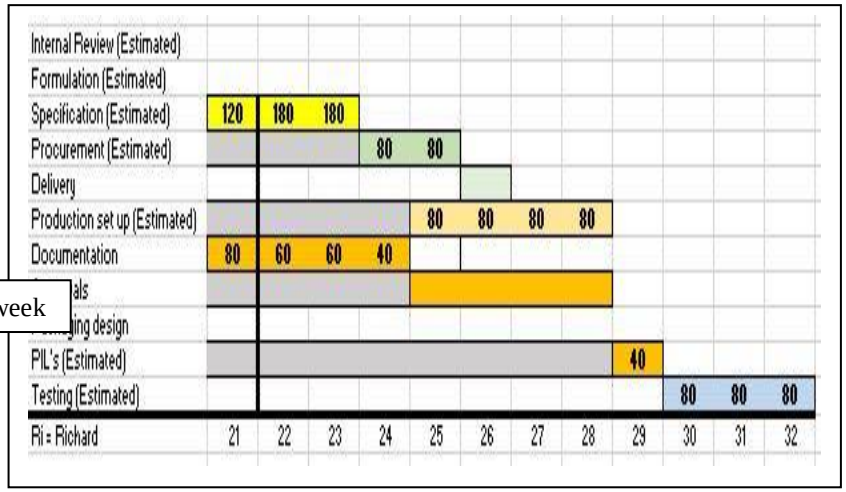
This conflict can be resolved by making the following alterations to the schedule

Week 21: Tom and Jane work 60 hours each =120 hrs. Joe and Michael work 40 hours each = 80 hours

Week 22 & 23: Joe, Tom & Jane work 12 hours per day, delivering 60 hours each per week = 180 hours or 360 total. Michael works 60 hours per week.

Week 24: Michael works 40 hours on Documentation extending this task by 1 week = 40 hours
This pushes the rest of the project timeline forward by 1 week, to 32 weeks.

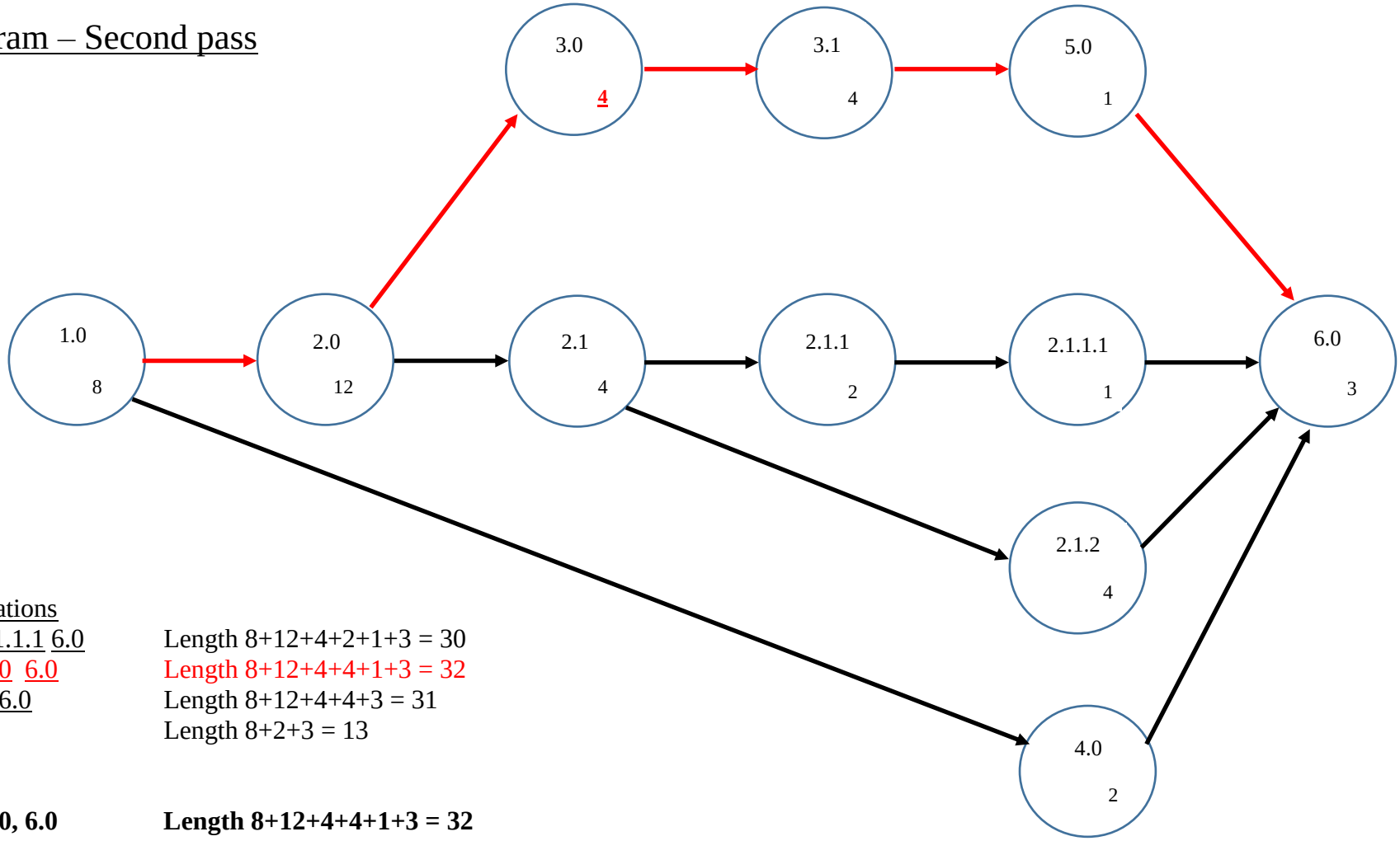




Updated Precedence Table – The difference here is Documentation duration increased from 3 to 4 weeks.

Description	People	Activity	Immediate Predecessors	Duration
Internal Review	-	1.0	-	8
Formulation	Joe, Mary & Tom	2.0	1.0	12
Specification	Joe, Jane & Tom	2.1	2.0	4
Documentation	Joe, Michael	3.0	2.0	**4**
Approval	-	3.1	3.0	4
Procurement	Tom, Sarah	2.1.1	2.1	2
Delivery	-	2.1.1.1	2.1.1	1
Production set up	Brian, Bill	2.1.2	2.1	4
Packaging Design	Richard	4.0	1.0	2
PILS	Tom	5.0	3.1	1
Testing	Brian, Bill	6.0	2.1.1.1, 2.1.2, 4.0, 5.0	3

Network Diagram – Second pass



Critical path calculations

1.0 2.0 2.1 2.1.1 2.1.1.1 6.0	Length 8+12+4+2+1+3 = 30
1.0 2.0 3.0 3.1 5.0 6.0	Length 8+12+4+4+1+3 = 32
1.0 2.0 2.1 2.1.2 6.0	Length 8+12+4+4+3 = 31
1.0 4.0 6.0	Length 8+2+3 = 13

Critical path is:

1.0, 2.0, 3.0, 3.1, 5.0, 6.0 **Length 8+12+4+4+1+3 = 32**

Burst points	Merge point
1.0 to 2.0 & 4.0	6.0 from 2.1.2 2.1.1.1 4.0 & 5.0
2.0 to 2.1 & 3.0	
2.1 to 2.1.1 & 2.1.2	

Cost of labour to be reduced by 20% from and including week 22 onwards.
Total cost from week 22 onwards = €20,400, minus 20% = €4,080 giving target cost of €16,320

Total cost from week 22 onwards						
	No of weeks	No of people	Total time in hours	Ordinary cost	Tom cost	People
Documentation	3	1	160	2400		Joe Michael
Approvals	4	-	-			-
Specification (Estimated)	2	3	360	3600	2400	Joe Tom Jane
Procurement (Estimated)	2	2	160	1200	1600	Tom Sarah
Delivery	1	-	-	-	-	-
Production set up (Estimated)	4	2	320	4800		Brian Bill
Packaging design	-	-	-	-		Richard
PIL's (Estimated)	1	1	40		800	Tom
Testing (Estimated)	3	2	240	3600		Brian Bill
		Total	€20,400	15600	4800	
		-20%	€4,080			
		Target cost	**€16,320**			

Assuming a standard 10% buffer has been added to each time duration, this can be removed and reduces the overall labour cost from €20,400 to **€18,360**

Total cost from week 22 onwards minus 10%							
	No of weeks	No of people	Total time in hours	-10%	Ordinary cost	Tom cost	People
Documentation	3	1	160	144	2160		Joe Michael
Approvals	4	-	-	-	-		-
Specification (Estimated)	2	3	360	324	3240	2160	Joe Tom Jane
Procurement (Estimated)	2	2	160	144	1080	1440	Tom Sarah
Delivery	1	-	-	-	-		-
Production set up (Estimated)	4	2	320	288	4320		Brian Bill
Packaging design	-	-	-	-	-		Richard
PIL's (Estimated)	1	1	40	36		720	Tom
Testing (Estimated)	3	2	240	216	3240		Brian Bill
Target	**€ 16,320**	Revised total	€18,360		14040	4320	

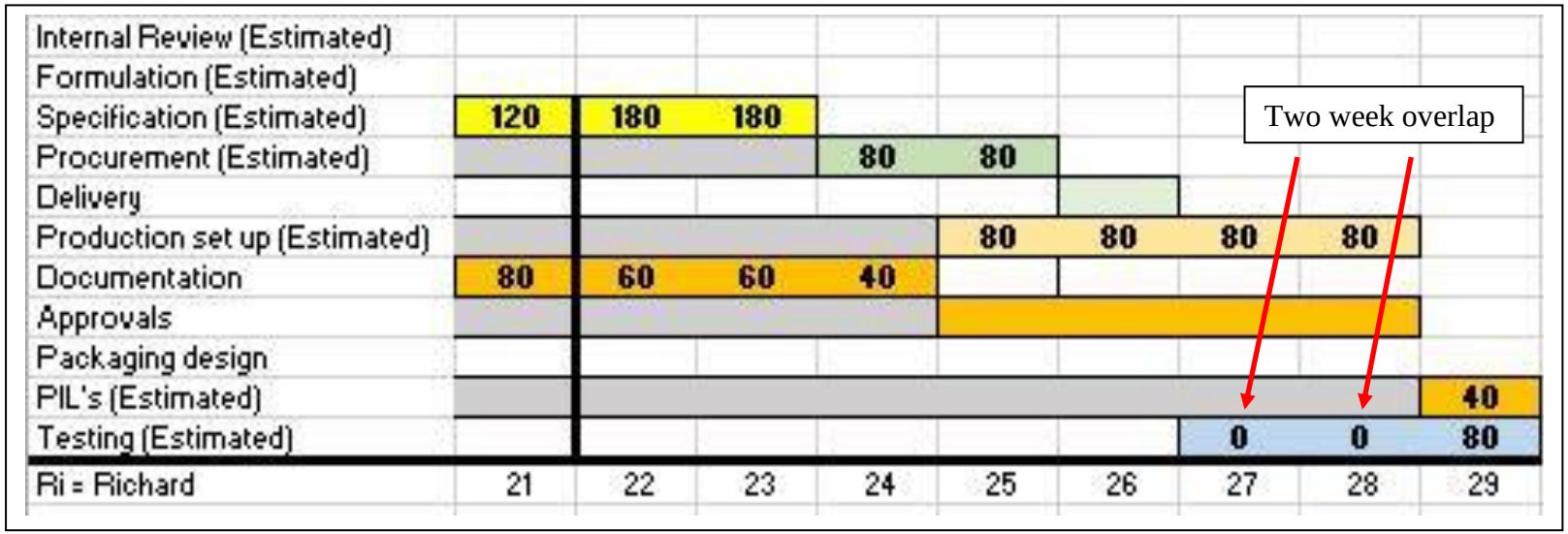
To reduce costs further, the most plausible assumption to make is that Brian and Bill can begin setting up the production processes for the first two weeks and then concurrently Test Run the upstream part of the production process, whilst setting up the downstream process.

Total cost minus 10% buffer & 2 wks concurrent testing	No of weeks	No of people	Total time in hours	-10%	Ordinary cost	Tom cost	People
Documentation	3	1	160	144	2160		Joe Michael
Approvals	4	-	-	-	-		-
Specification (Estimated)	2	3	360	324	3240	2160	Joe Tom Jane
Procurement (Estimated)	2	2	160	144	1080	1440	Tom Sarah
Delivery	1	-	-	-	-		-
Production set up (Estimated)	4	2	320	288	4320		Brian Bill
Packaging design	-	-	-	-	-		Richard
PIL's (Estimated)	1	1	40	36		720	Tom
Testing (Estimated)	1	2	80	72	1080		Brian Bill
		Revised total	**€16,200**		€11,880	€4,320	

On the Gant chart below, this is represented by an overlap of Production Setup and Testing for two weeks.

This reduces costs by a further €2160 bringing it under the target cost saving of €16,320. Project task time is reduced by a further 2 weeks, to 29 weeks.

Total cost reduced by just over 20% from €20,400 to €16,200


Internal Review (Estimated)
Formulation (Estimated)
Specification (Estimated)
120
180
180
Procurement (Estimated)
80
80
Delivery
Production set up (Estimated)
80
80
80
80
Documentation
80
60
60
40
Approvals
Packaging design
PIL's (Estimated)
40
Testing (Estimated)
0
0
80
Ri = Richard
21
22
23
24
25
26
27
28
29
Two week overlap