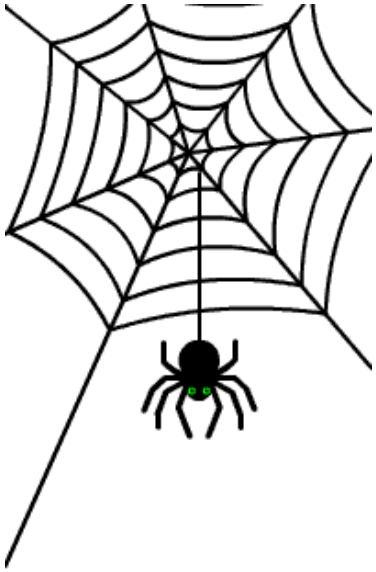
Enhanced Resource Planning

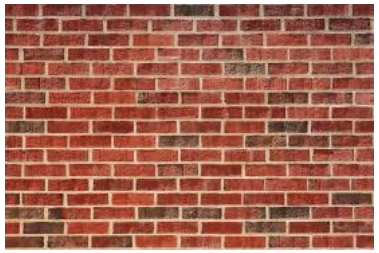


With a few resource planning enhancements can get you better schedule models. Just some schedule adjustments you are to do manually when not available within your resource planning tool. If you plan for resources this is what you do.

It is easy, logical and predictable.

- In our models It is convenient to define:

resource quantities
& workloads



volume of work &
production rates

multi-resources
& skill-resources

teams

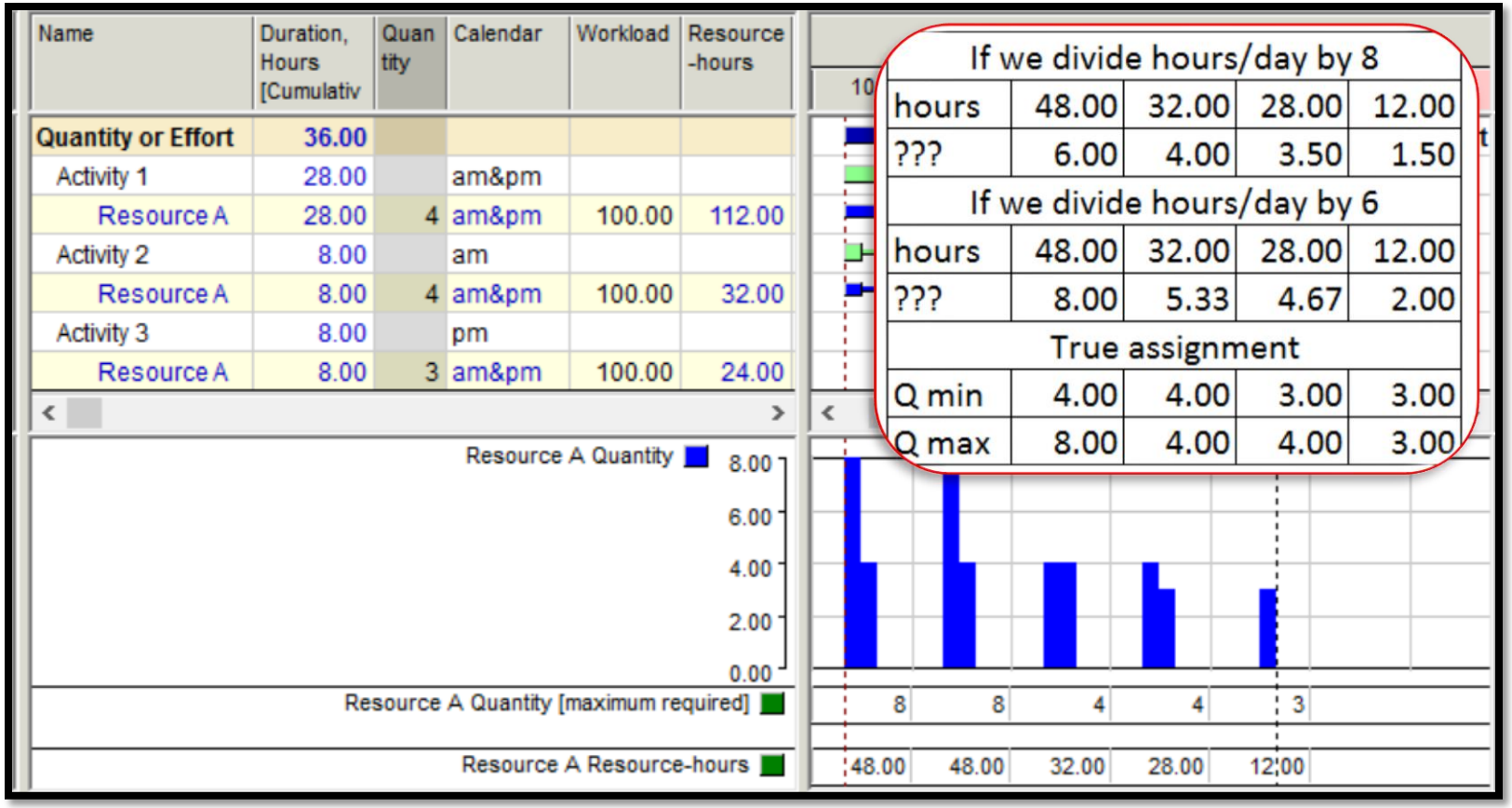
consumable resources
& spatial resources

financial resources

Resource Quantities:

- *Resource Quantity* and *Effort Units* are not the same and must be defined using different units of measure. Resource Quantity might be 1 ea. For the same assignment Effort Units might be 24 man-hours if labor resource.
- *Calculating the required quantity from effort units is not always easy, a simple conversion factor will not make it.* An average makes sense only when all resources are busy all the time, otherwise you might under/over estimate the required quantity.
- Communicating a resource plan by only using effort is not good enough.
- Most commercially available CPM scheduling software do not consider resource quantity but only effort units.

There is no simple relationship between resource hours [effort] and resource quantity. Staggering of activities, multiple activity and resource calendars on multiple shifts complicate the relationships.



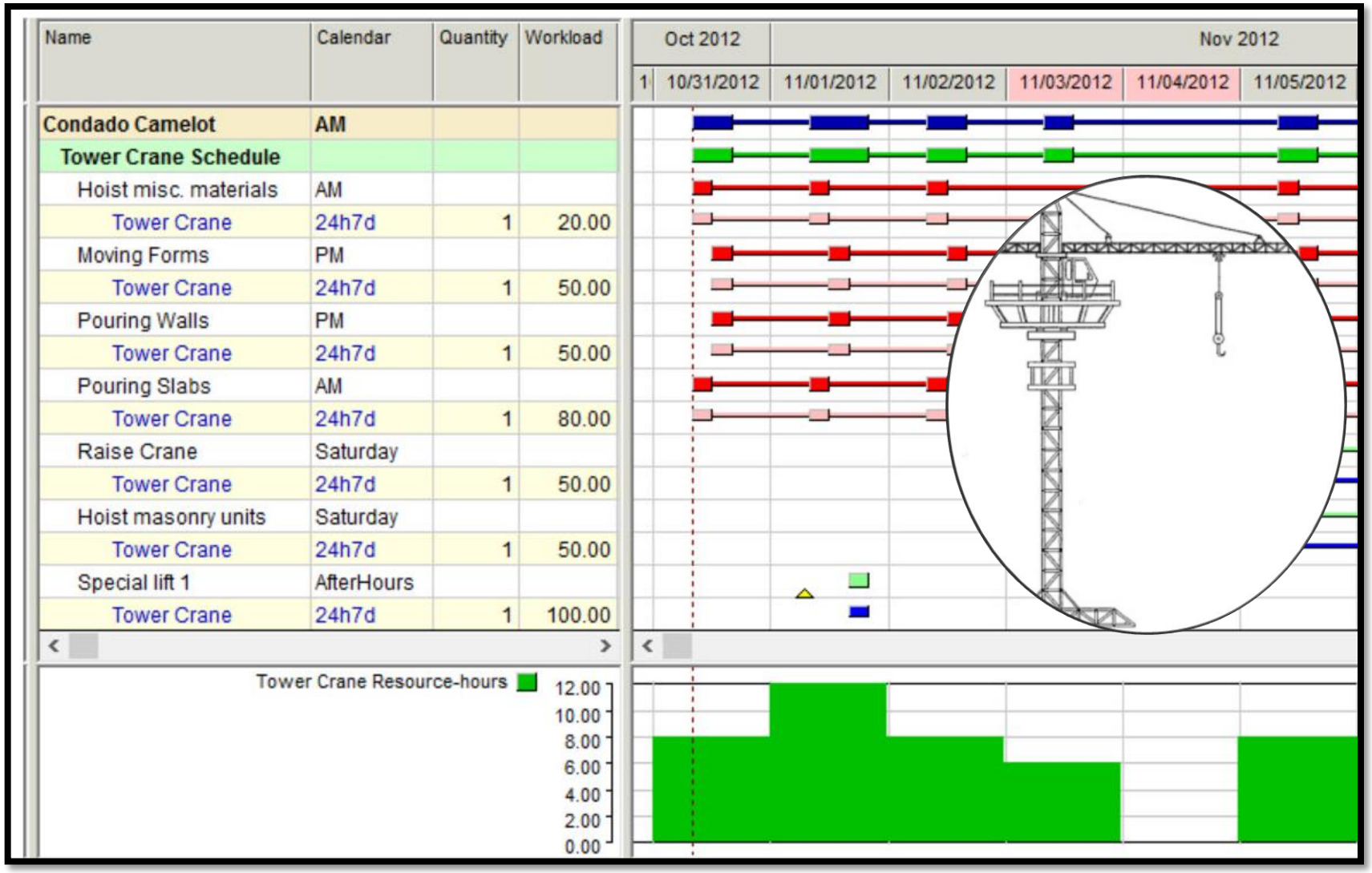
If we divide hours/day by 8				
hours	48.00	32.00	28.00	12.00
???	6.00	4.00	3.50	1.50
If we divide hours/day by 6				
hours	48.00	32.00	28.00	12.00
???	8.00	5.33	4.67	2.00
True assignment				
Q min	4.00	4.00	3.00	3.00
Q max	8.00	4.00	4.00	3.00

When there are partial workloads it becomes impossible to get reliable quantities.

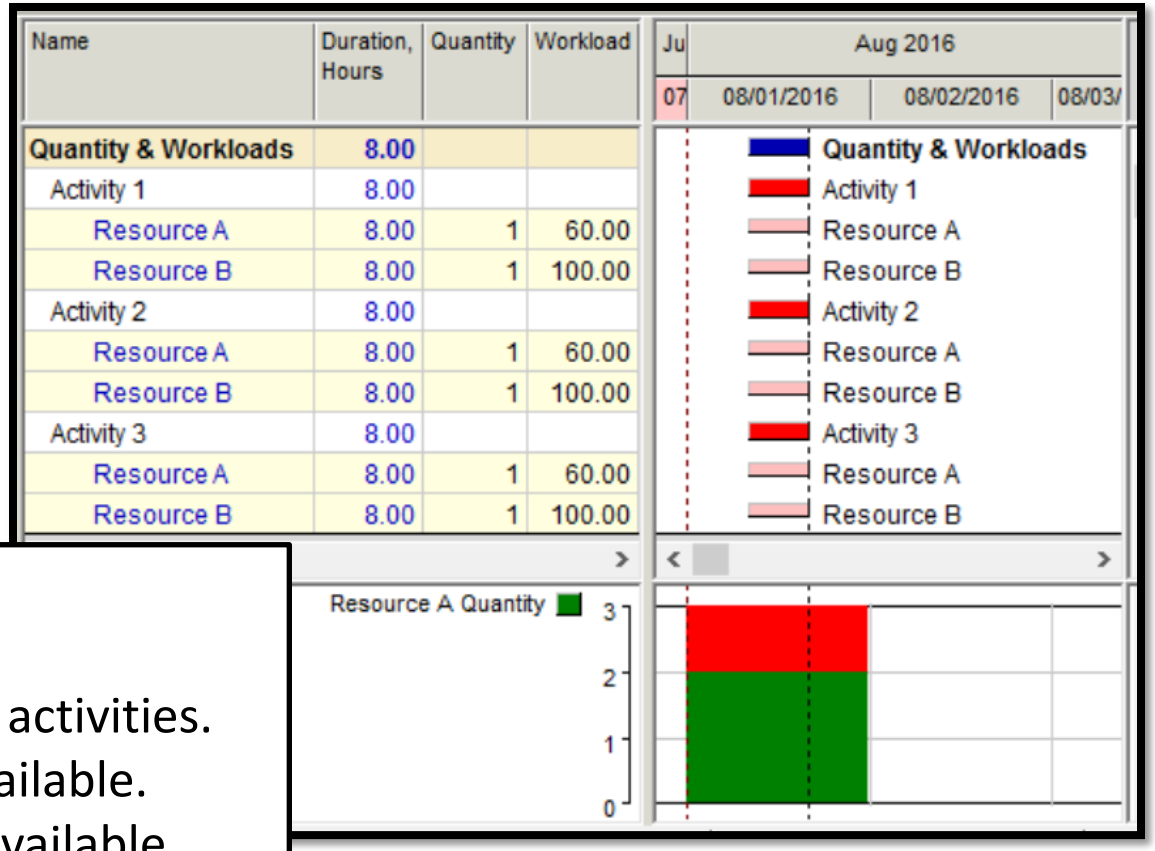
Resource Workloads:

- We define *Workload* as the percentage of time a resource is uniformly distributed throughout team execution.
- If less than 100% we call it *Partial Workload*.
- Sharing of some resources on part time basis is an everyday issue no Scheduler or Project Manager can overlook.
- Some activities [such as concrete pouring] work only part of the day sharing their resources the remaining part of the day with other activities.
- Some resources [such as a crane] work only part of the day on any given activity and the remaining part of the day with other activities.

Sharing of equipment such as a crane is an everyday issue in multi-story building construction .



Resource constraints are about available resource quantities.



Name	Duration, Hours	Quantity	Workload
Quantity & Workloads	8.00		
Activity 1	8.00		
Resource A	8.00	1	60.00
Resource B	8.00	1	100.00
Activity 2	8.00		
Resource A	8.00	1	60.00
Resource B	8.00	1	100.00
Activity 3	8.00		
Resource A	8.00	1	60.00
Resource B	8.00	1	100.00

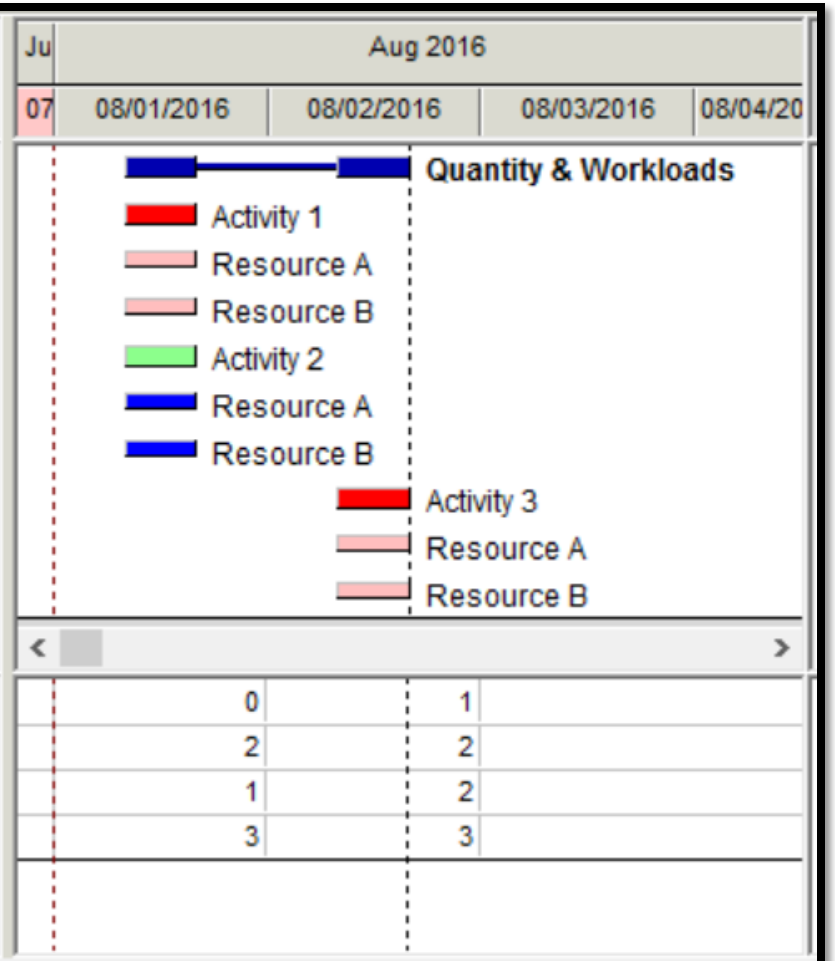
Scenario:

There are three activities.
There are no links among the activities.
There are two resources A available.
There are three resources B available.
Duration of all activities is eight hours.
All activities and resources share the same 8h/day calendar.
All activities require one Resource A with 60% workload and one Resource B with 100% workload as a single team.

Non-leveled Schedule

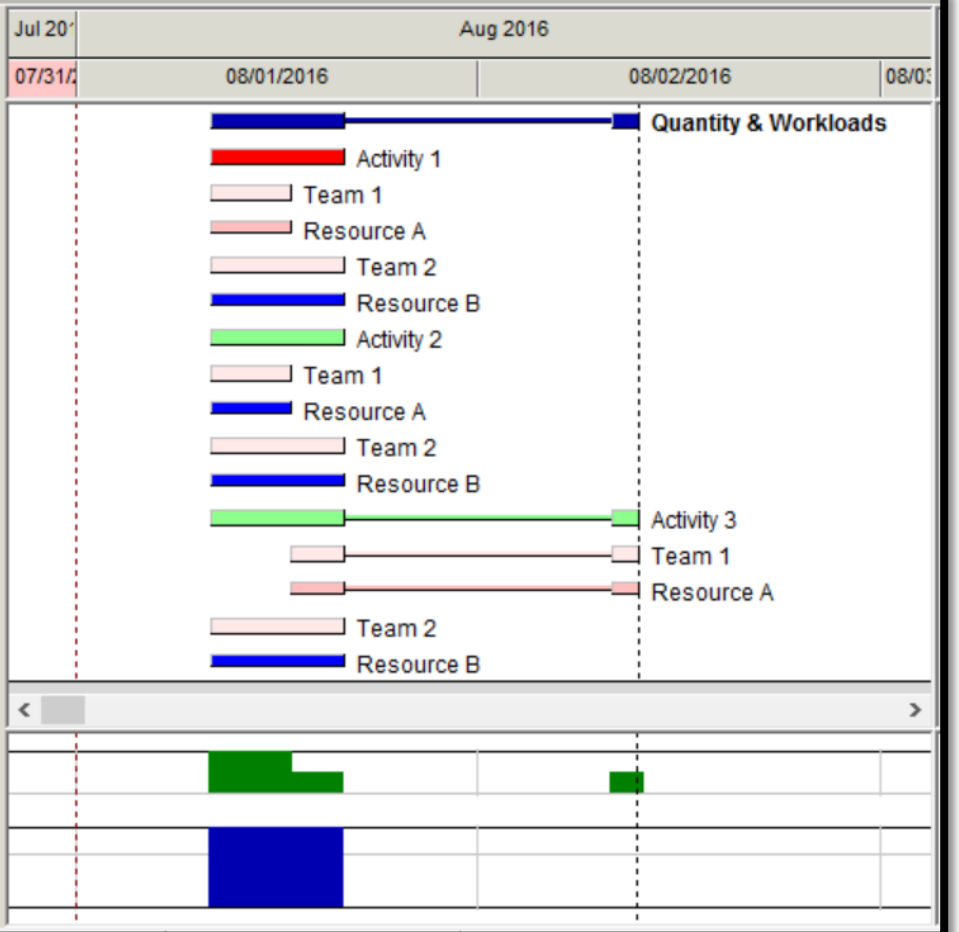
If resources are to work together as a team while multi-tasking it will take two days.

Name	Duration, Hours	Quantity	Workload	Resource -hours
Quantity & Workloads	**16.00**			**38.40**
Activity 1	8.00			12.80
Resource A	8.00	1	60.00	4.80
Resource B	8.00	1	100.00	8.00
Activity 2	8.00			12.80
Resource A	8.00	1	60.00	4.80
Resource B	8.00	1	100.00	8.00
Activity 3	8.00			12.80
Resource A	8.00	1	60.00	4.80
Resource B	8.00	1	100.00	8.00

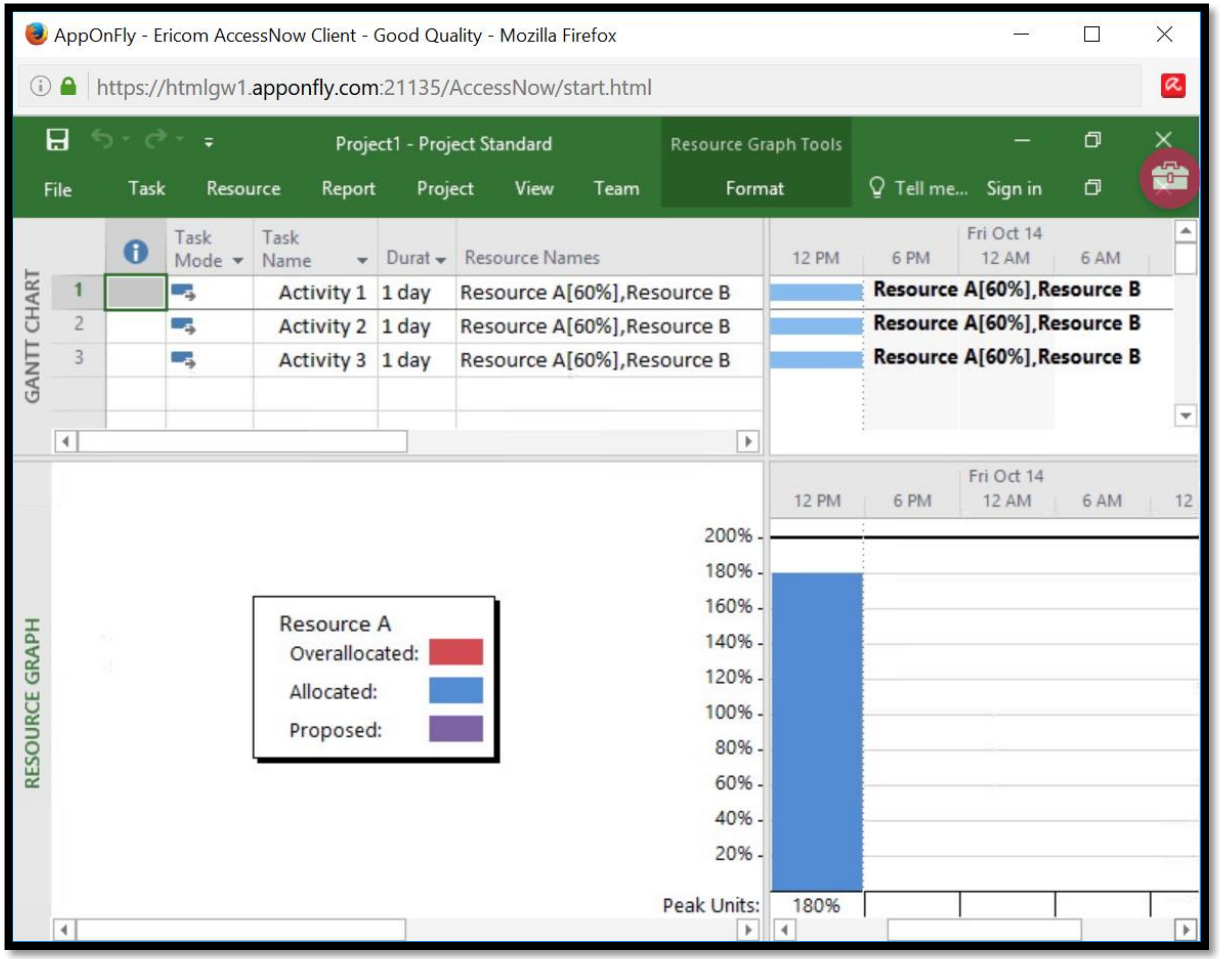


If resources were allowed to work independent of each other as separate teams instead of multi-tasking on same team it will take less than two days but more than a single day.

Name	Duration, Hours	Duration, Days	Quantity	Workload	Resource -hours
Quantity & Workloads	**9.60**	**1.20**			**38.40**
Activity 1	8.00	1.00			12.80
Team 1	4.80	0.60			4.80
Resource A	4.80	0.60	1	100.00	4.80
Team 2	8.00	1.00			8.00
Resource B	8.00	1.00	1	100.00	8.00
Activity 2	8.00	1.00			12.80
Team 1	4.80	0.60			4.80
Resource A	4.80	0.60	1	100.00	4.80
Team 2	8.00	1.00			8.00
Resource B	8.00	1.00	1	100.00	8.00
Activity 3	9.60	1.20			12.80
Team 1	4.80	0.60			4.80
Resource A	4.80	0.60	1	100.00	4.80
Team 2	8.00	1.00			8.00
Resource B	8.00	1.00	1	100.00	8.00



Microsoft Project as well as any other software that cannot account for resource quantity will get leveling of partial workloads wrong.



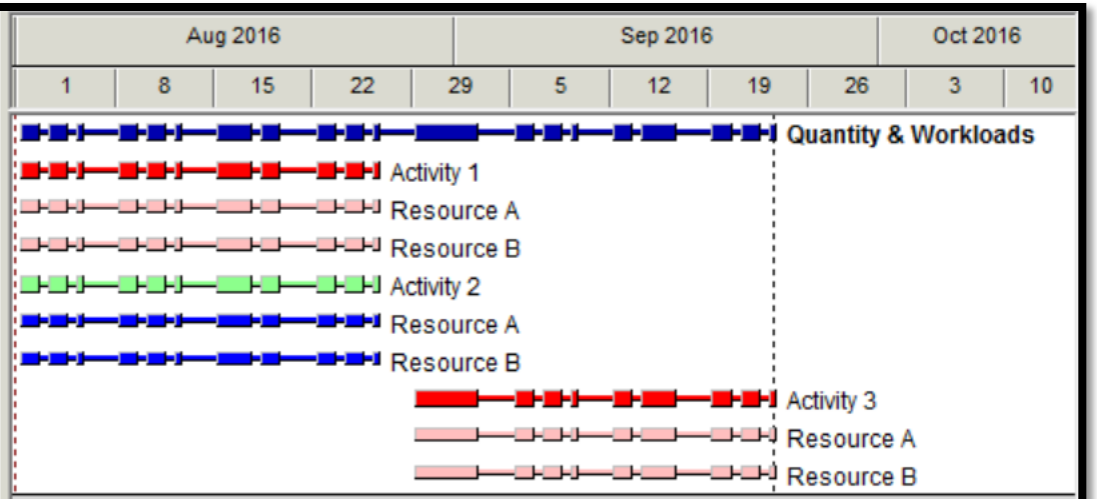
Microsoft Project will incorrectly report no over-allocation at all.

The increase from 1 day to 2 days is a whooping 100% increase in duration!

That is too much to be overlooked, such wrong resource leveling is unacceptable.

If the duration of the activities is 20 days the software calculation error would be 20 days!

Name	Duration, Hours	Quantity	Workload	Resource -hours
Quantity & Workloads	**320.00**			**38.40**
Activity 1	160.00			12.80
Resource A	160.00	1	60.00	96.00
Resource B	160.00	1	100.00	160.00
Activity 2	160.00			12.80
Resource A	160.00	1	60.00	96.00
Resource B	160.00	1	100.00	160.00
Activity 3	160.00			12.80
Resource A	160.00	1	60.00	96.00
Resource B	160.00	1	100.00	160.00

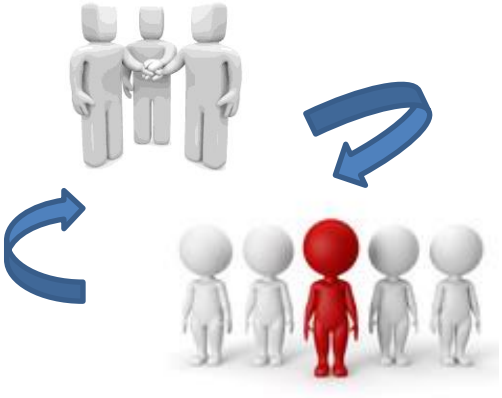


	1	8	15	22	29	5	12	19	26	3	10
Resource A Quantity [max]	0	0	0	0	1	1	1		1		
Resource A Availability	2	2	2	2	2	2	2		2		
Resource B Quantity [max]	1	1	1	1	2	2	2		2		
Resource B Availability	3	3	3	3	3	3	3		3		

The need for separate fields for resource quantity and effort is not just a matter of convenience it is also a matter of getting reliable resource overload visibility and resource leveling.

Variable Quantity and Variable Workload Resource Assignments:

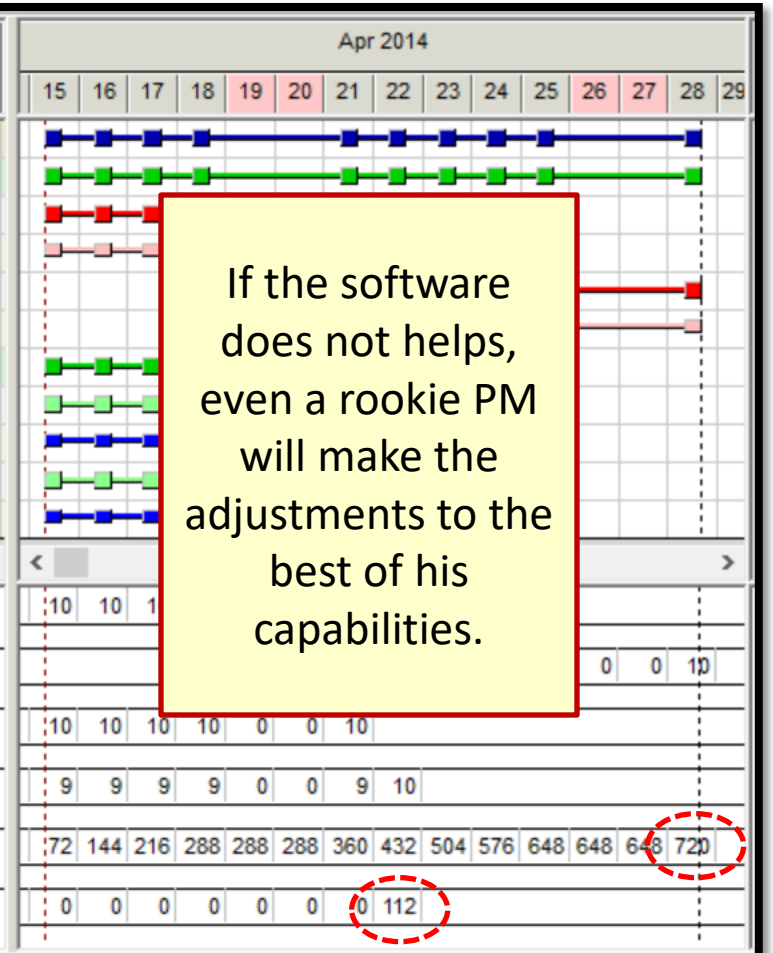
- Schedulers may assign a range for quantity and workload resource assignments. Spider Project will select what resource quantity and what workload to use at any moment based on current resource availability, production rate and activity volume of work. Then the activity duration will be automatically adjusted. We call this Variable Resource Assignments.



Resource leveling with Variable Quantities.

Name	Available Quantity
Resource A	19
Resource B	19

Name	Duration, Days	Volume [Cumulative]	Production /hour	Quantity	Variable WL&Q	Quantity [Minimal]
Assignments	10.0	1 200				
Fixed Quantity	10.0	600				
Activity 1	5.0	400				
Resource A	5.0	400	1	10	No	
Activity 2	5.0	400				
Resource A	5.0	400	1	10	No	
Variable Quantity	5.5	600				
Activity 1B	5.0	400				
Resource B	5.0	400	1	10	Yes	7
Activity 2B	5.5	400				
Resource B	5.5	400	1	10	Yes	7

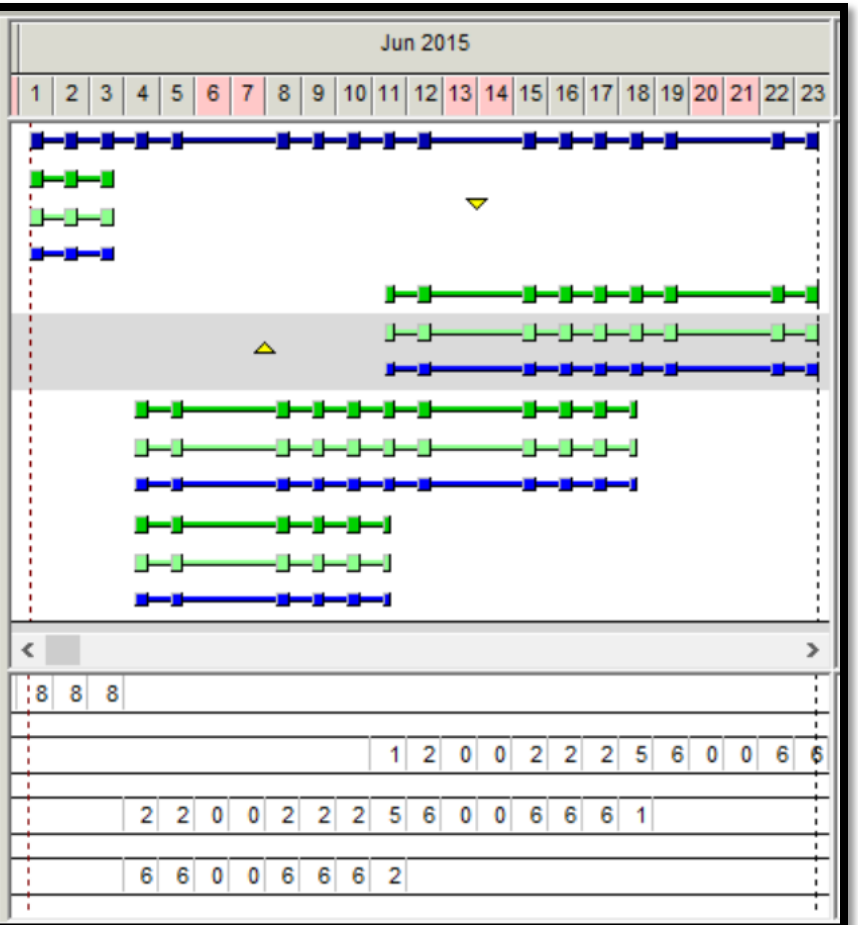


If the software does not helps, even a rookie PM will make the adjustments to the best of his capabilities.

It makes no sense to delay an activity just because out of 10 resources one is not available.

It is common in design offices for designers to be assigned several tasks a day at *Variable Workloads*.

Name	Priority	Volume	Unit	Workload [Maxim	Workload [Minima	Variable workload
Variable Workloads						
Design Job 01						
Electrical Design	100	24.00	Hours			
Electrical Designer		24.00	Hours	100.00	25.00	Yes
Design Job 02						
Electrical Design	80	32.00	Hours			
Electrical Designer		32.00	Hours	75.00	25.00	Yes
Design Job 03						
Electrical Design	60	40.00	Hours			
Electrical Designer		40.00	Hours	75.00	25.00	Yes
Design Job 04						
Electrical Design	70	32.00	Hours			
Electrical Designer		32.00	Hours	75.00	25.00	Yes

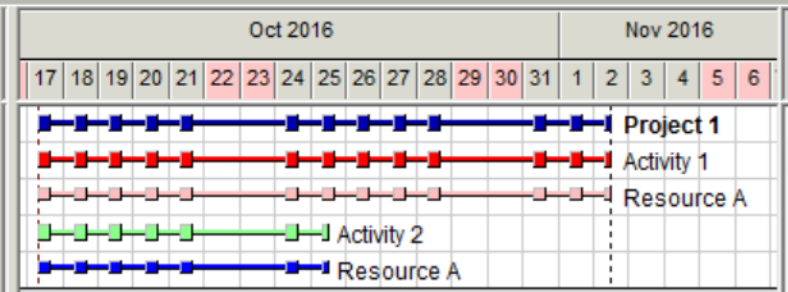


Volume of Work:

- *Work* and *Effort Units* are not the same and must be defined using different units of measure. Work might be installing 1,000 ea. bricks. For the same assignment Effort Units might be 8 man-hours.
- For some activities it makes sense to define activity duration as a function of volume of work , resource quantity and production rates. This we call *Productivity Type* activities.
- Productivity Type activity duration is calculated based on the resource availability and assignment, the work to be performed, the priorities and the constraints.
- *Software that does not distinguish between effort, resource quantities and volume of work is not transparent, is a burden for field managers.*

When the schedule is calculated, the available resources, their quantities, their productivity and the total volume of work to be performed will determine the total duration of the activity.

Name	DPH type	Volume [Cumulative]	Quantity	Production/ hour	Duration, Hours [Cumulative]
Project 1					**100.00**
Activity 1	Productivity	100.00			100.00
Resource A	Productivity	100.00	1	1.00	100.00
Activity 2	Productivity	100.00			50.00
Resource A	Productivity	100.00	1	2.00	50.00



When the schedule is updated, the demand and availability for available resources will usually change.
Not reacting to these changes and keeping the activity duration fixed is not acceptable.

A good model shall be adaptive to change to suit different [predictable] conditions.

- Activities status without volume of work is not good enough. That activity time has elapsed or that some effort have been performed does not means some volume of work have been done.
- Remaining duration is a function of remaining work and team(s) production rates, calculating remaining duration from % duration is wrong unless the activity is a Duration Type such as concrete curing.
- Volume of Work is essential to define productivity, % of work will not give you the units so necessary for meaningful production rates.
- *Communication is essential; to manage their activities and resources construction field supervisors talk quantity of resources, volume of work and production rates.*

Multi Resources:

It is convenient to define resource crews (multi-resources) and then assign them to project activities as if a single resource. Each crew consists of certain resources and assigning crew we assign all of them.

Skills:

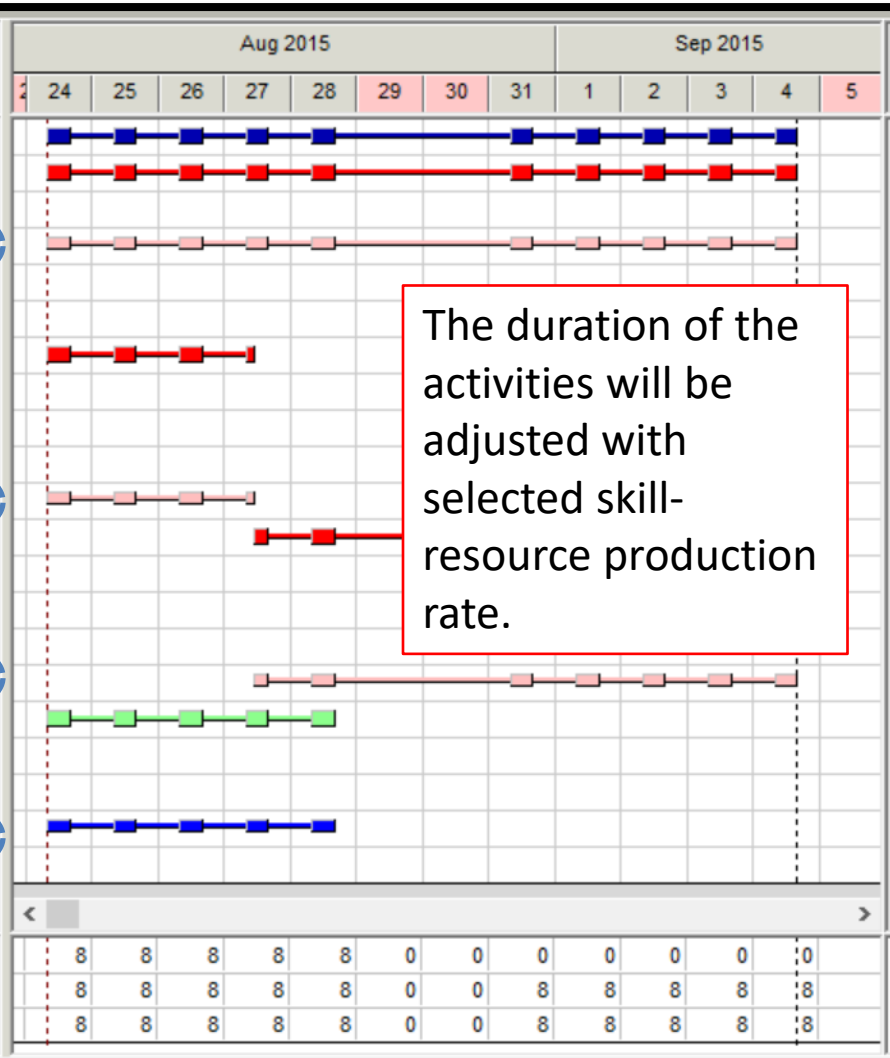
Spider Project includes skill scheduling capability that can automatically assign resources that have necessary skills based on their availability.

To do this it is necessary to define what resources have certain skills. Any resource might have different skills and be better at same skill than other resources. It is also useful to be able to assign skills to teams [multi-resources].

Skills are usually assigned when it is not clear what resources will be available at the moment when activity become ready for execution.

All resources within a skill can perform any of the activities but resources might have different production rates.

Name	Duration, Days [Cumulative]	Quantity	Volume [Cumulative]	Quantity [Scheduled]	Productivity
Assign available by Skills	**10.00**				
Activity 1	10.00		80.00		
Resource skill A	10.00	1			
Peter	10.00	1	80.00		1.00
Bill					1.25
Victor					1.50
Activity 2	3.33		80.00		
Resource skill A	3.33	1			
Peter					2.00
Bill					2.50
Victor	3.33	1	80.00		3.00
Activity 3	6.67		80.00		
Resource skill A	6.67	1			
Peter					1.00
Bill					1.25
Victor	6.67	1	80.00		1.50
Activity 4	5.00		80.00		
Resource skill A	5.00	1			
Peter					2.00
Bill	5.00	1	80.00		2.00
Victor					2.00

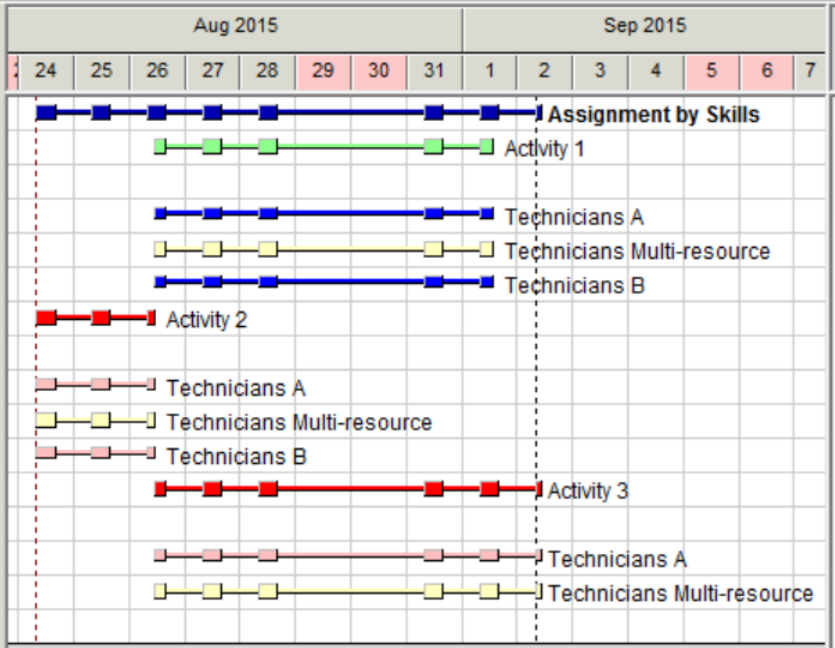


The duration of the activities will be adjusted with selected skill-resource production rate.

Phase "Assign available by Skills" (Code: Project1)

When the production rate is non linear to the resource quantities we simply define the alternate crews each with their own production rate as a multi-resource and set them as belonging to a same skill.

Name	Quantity	Quantity [Scheduled]	Productivity	Volume of Work	Duration, Hours	Duration, Days
Assignment by Skills					**56.25**	**7.03**
Activity 1				900.00	34.62	4.33
Resource skill A	2				34.62	4.33
Technicians A	1	1	10.00	346.15	34.62	4.33
Technicians Multi-resource	1	1		553.85	34.62	4.33
Technicians B	2	2	8.00	553.85	34.62	4.33
Activity 2				900.00	18.75	2.34
Resource skill A	4				18.75	2.34
Technicians A	3	3	10.00	562.50	18.75	2.34
Technicians Multi-resource	1	1		337.50	18.75	2.34
Technicians B	2	2	9.00	337.50	18.75	2.34
Activity 3				900.00	37.50	4.69
Resource skill A	2				37.50	4.69
Technicians A	2	2	12.00	900.00	37.50	4.69
Technicians Multi-resource						
Technicians B	2		6.00			



In this model 2 Technicians B will replace 1 technician A as technician A is more productive than B. If using variable quantity it can be either 1 or 2 depending on availability.

Technicians A Quantity	3	3	3	3	3	0	0	3	3	2
Technicians B Quantity	2	2	2	2	2	0	0	2	2	0
Technicians A Availability	3	3	3	3	3	0	0	3	3	3
Technicians B Availability	2	2	2	2	2	0	0	2	2	2

If to define the production rate at the multi-resource level ↓

Name	Quantity	Quantity [Scheduled]	Productivity	Volume of Work	Duration, Hours	Duration, Days
Activity 2				900.00	19.57	2.45
Resource skill A	4				19.57	2.45
Technicians A	3	3	10.00	586.96	19.57	2.45
Technicians Multi-resource	1	1	16.00	313.04	19.57	2.45
Technicians B	2	2		313.04	19.57	2.45

Original model was defined with production rate of

9 production units / hour / resource

for a total of

18 production units / hour/ crew.

We changed the production rate to be

16 production units / hour /crew

The activity duration changed to reflect the change in crew production rate.

Teams & Shifts:

Team assignment means that assigned individual resources as well as multi-resources work as a team – if some member of the team is not available activity execution will be delayed until required members are available because they can work only as a team.

Independent assignment means that assigned resource may work on activity without interaction with others, it is a team of one single resource.

Shifts are recurring periods in calendar rotation – multiple teams can be assigned to an activity independently of each other to work in different shifts.

Multiple shift assignments are very common.

It can be a different crew/resource

- working on weekends.
- working at night.
- working different work patterns during different seasons.

It can be the same resource crew/resource

- on different shifts such as when sharing equipment.
- on different work patterns during different seasons.

More often than not the production rates among different shifts are different.

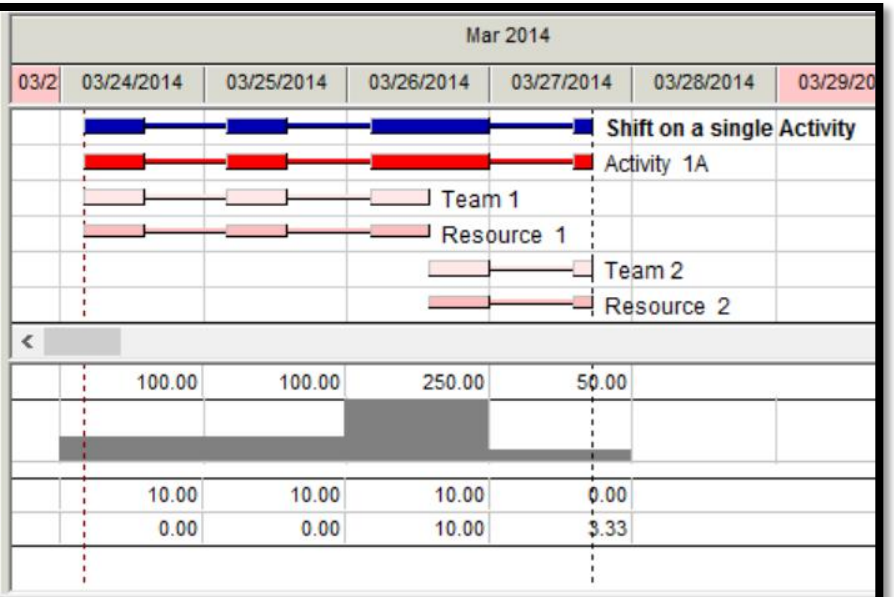
Simple shifts assignments scenario:

- Activity 1A - 500 cm rock excavation Tams 1 and 2 working the activity on different shifts.
- Team 1: 1ea Resource 1 with a production rate of 10 cm/hr and works Monday, Tuesday and Wednesday 10 hrs/day.
- Team 2: 1ea Resource 2 with a production rate of 15 cm/hour and works on Wednesday, Thursday and Friday 10 hrs./day.

We have a single activity, two teams, two shifts, the production rate of each shift is different, therefore the duration of the activity will depend on how the work is distributed among the shifts.

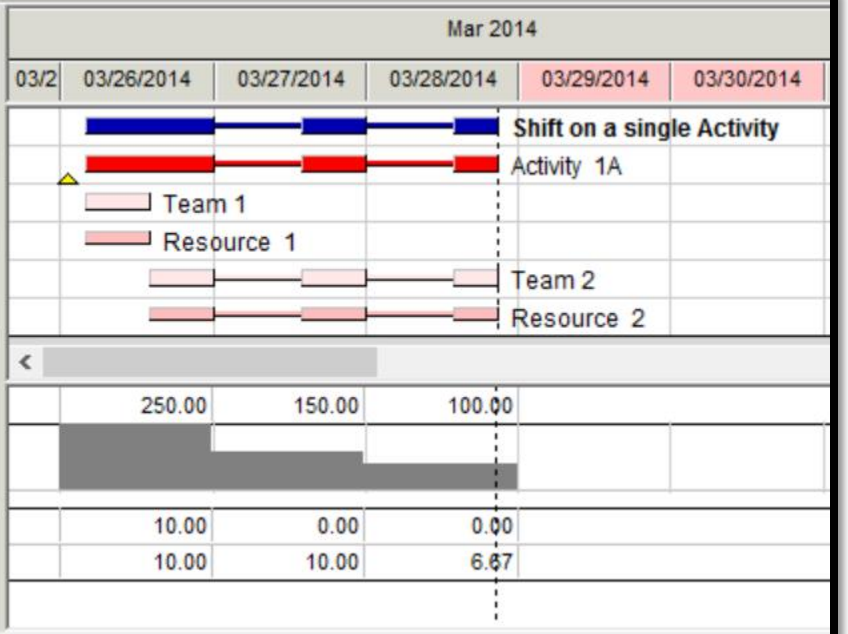
- If activity starts on Monday it will take ~ 3 days 3 hrs.
- If activity starts on Wednesday it will take ~ 2 days 7 hrs.

Name	Duration, Hours [Cumulativ	Q	Volume [Cumulative]	Unit of volume	Hourly Production Rate
Shift on a single Activity	43.33				
Activity 1A	43.33		500.00	cm rock	
Team 1	30.00		300.00	cm rock	
Resource 1	30.00	1	300.00	cm rock	10.00
Team 2	13.33		200.00	cm rock	
Resource 2	13.33	1	200.00	cm rock	15.00



If starting on Monday:

Name	Duration, Hours [Cumulativ	Q	Volume [Cumulative]	Unit of volume	Hourly Production Rate
Shift on a single Activity	36.67				
Activity 1A	36.67		500.00	cm rock	
Team 1	10.00		100.00	cm rock	
Resource 1	10.00	1	100.00	cm rock	10.00
Team 2	26.67		400.00	cm rock	
Resource 2	26.67	1	400.00	cm rock	15.00



If starting on Wednesday:

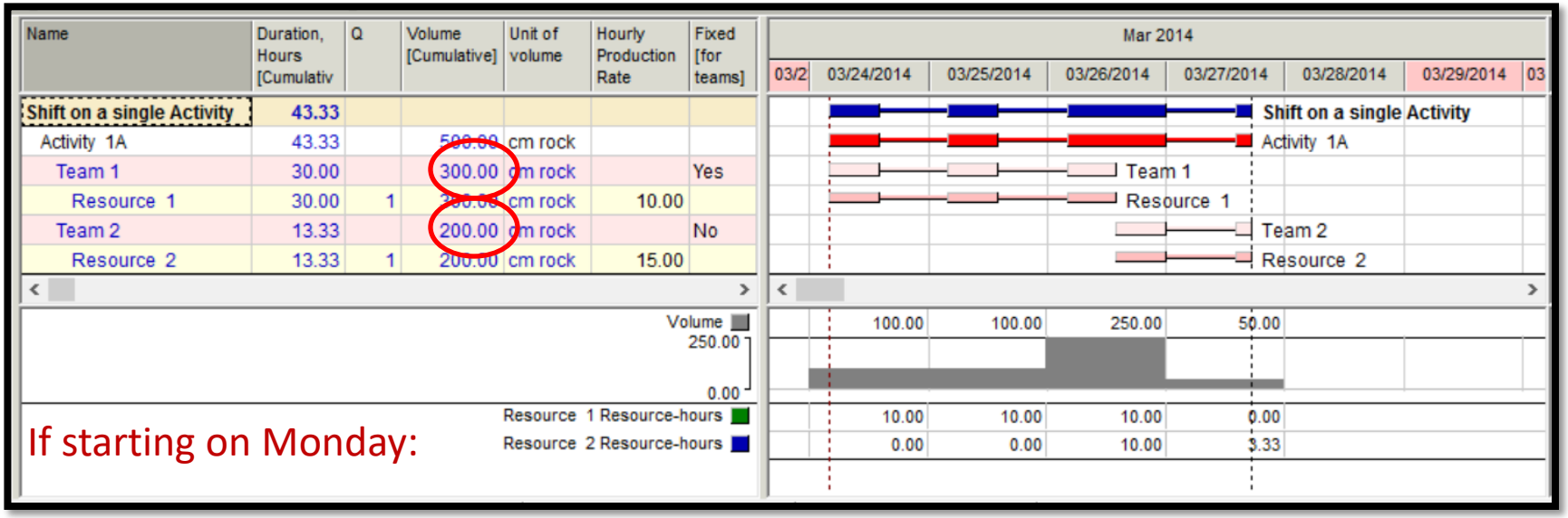
In the prior scenario the volume of work by each team was not “fixed for teams” and therefore the volume of work by each team varied depending on when the activity starts.

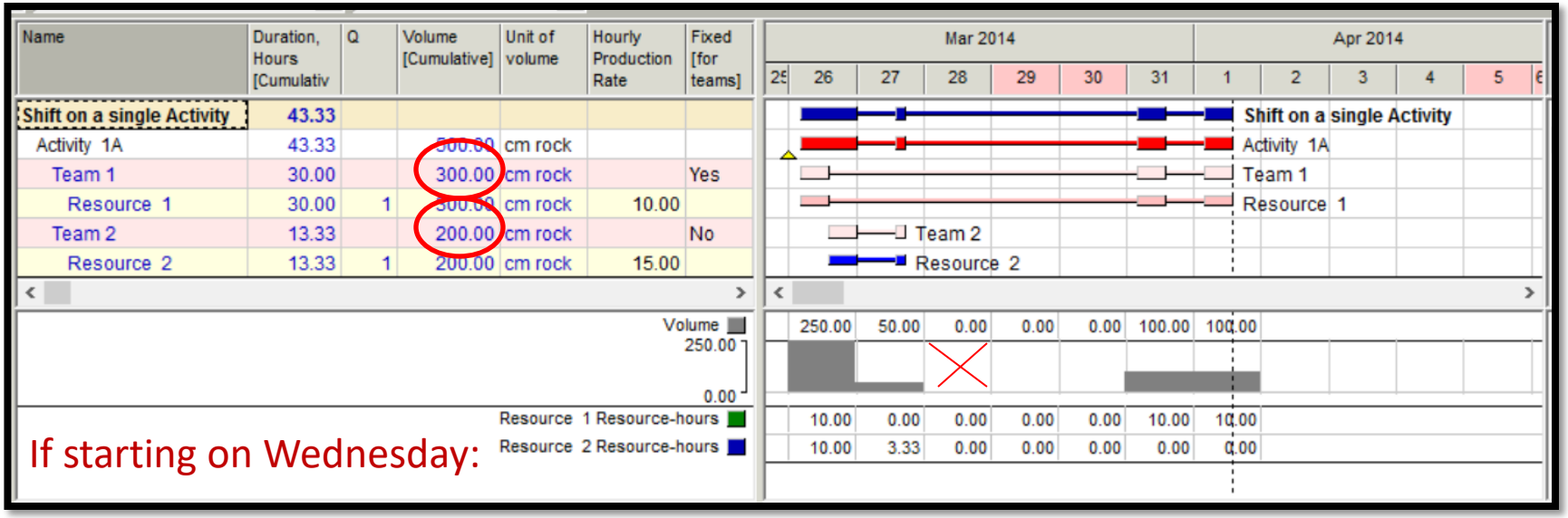
- This scenario cannot be worked around by separate activities.
- It is the most common shift scenario in construction schedules.

If you want to control the team volume of work or how much effort in case of duration type activities then you can set it as “fixed for teams”.

- This scenario can be worked around by using separate activities.
- On the next slide a “fixed for teams” scenario will be illustrated.

If volume of work is fixed for teams.





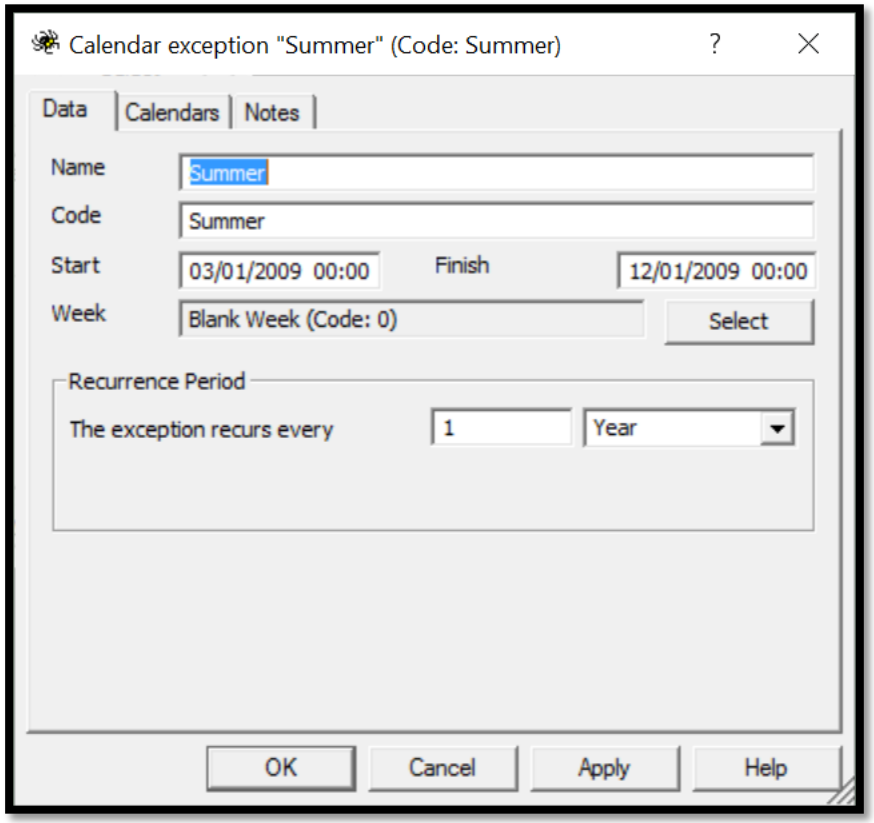
An interesting case for shift modeling is when their recurrence period follows annual weather seasons.

Seasonal Resource assignments scenario:

- Four activities, Activities 1, 2, 3 & 4 , each with a volume of work of 4,000 cm of trench excavation.
- Team 1 works on Summer on an 8 hour per day 5 days a week shift with a production rate of 10 cm per hour.
- Team 2 works on Winter on a 6 hour per day 5 days a week shift with a production rate of 5 cm per hour.

We have four activities, two shifts [Summer & Winter], the production rate of each shift is different, therefore the duration of the activities will depend on what shifts end up performing the work.

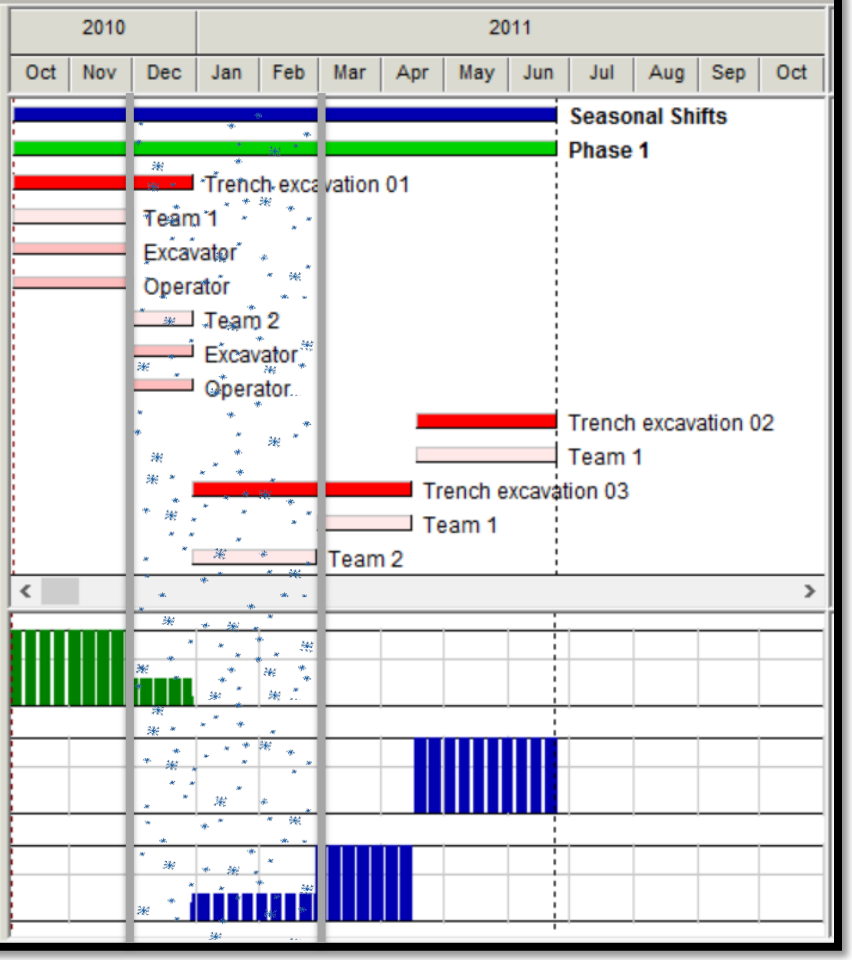
With the use of independent teams working on different seasons as very long shift periods the software will automatically adjust activity duration considering different production rates for each season a portion of the work is scheduled.



Code	Name	Week code	Main week name	1-MO	2-TU	3-WE	4-TH	5-FR	6-SA	0-SU	Calendar exceptions [names]
8hdw	Calendar 1	1	8/7	8.00	8.00	8.00	8.00	8.00	8.00	8.00	
Summer	Summer	2	Summer	8.00	8.00	8.00	8.00	8.00			Winter
Winter	Winter	3	Winter	6.00	6.00	6.00	6.00	6.00			Summer

Seasonal Resources sample schedule:

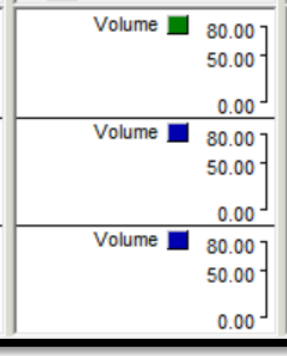
Name	Duration, Days [Cumulative]	Volume [Remaining]	Unit	Productivity [per hour]	Start	Finish
Seasonal Shifts	**174.00**				**10/04/2010**	**06/24/2011**
Phase 1	**174.00**				**10/04/2010**	**06/24/2011**
Trench excavation 01	58.00	4 000.00	CM		10/04/2010	12/30/2010
Team 1	42.00	3 360.00	CM		10/04/2010	11/30/2010
Excavator	42.00	3 360.00	CM	10.00	10/04/2010	11/30/2010
Operator	42.00	3 360.00	CM		10/04/2010	11/30/2010
Team 2	21.33	640.00	CM		12/01/2010	12/30/2010
Excavator	21.33	640.00	CM	5.00	12/01/2010	12/30/2010
Operator	21.33	640.00	CM		12/01/2010	12/30/2010
Trench excavation 02	50.00	4 000.00	CM		04/18/2011	06/24/2011
Team 1	50.00	4 000.00	CM		04/18/2011	06/24/2011
Trench excavation 03	66.00	4 000.00	CM		12/30/2010	04/15/2011
Team 1	34.00	2 720.00	CM		03/01/2011	04/15/2011
Team 2	42.67	1 280.00	CM		12/30/2010	02/28/2011



Activity "Trench excavation 01" (Code: 01)

Activity "Trench excavation 02" (Code: 02)

Activity "Trench excavation 03" (Code: 03)



Consumable Resources:

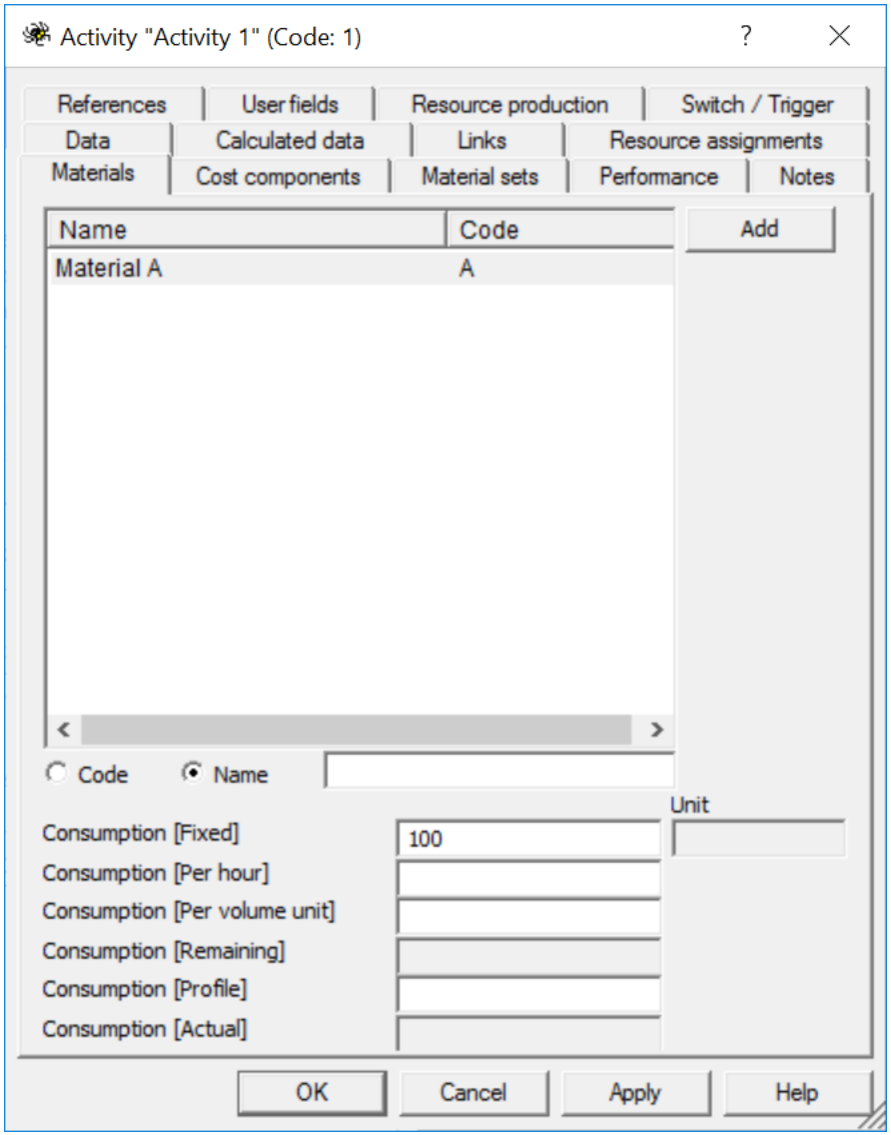
Consumable Resources are resources that may be produced or consumed by a task. When depleted activities will be delayed until more consumables become available.

Typical examples are raw materials.

On the other hand the traditional Renewable Resources will be replenished when activity ends making them available again.

Both resource types must be resource leveled in order to get feasible and reliable schedules.

Both resource types must be resource leveled in order to get true critical path.



Spider Project Materials represent Consumable Resources.

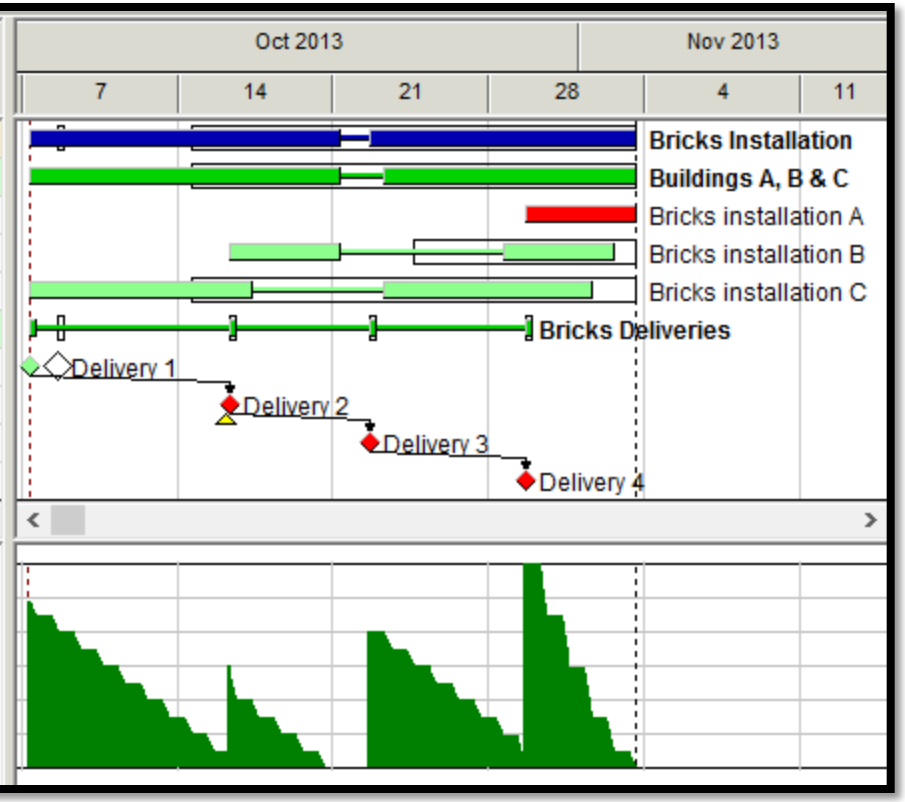
Usually a Delivery Task is used for Material Production while an Installation Task is used for Consumption.

Making Materials available for Consumption is done by setting negative consumption.

Bricks as Consumable Resources:

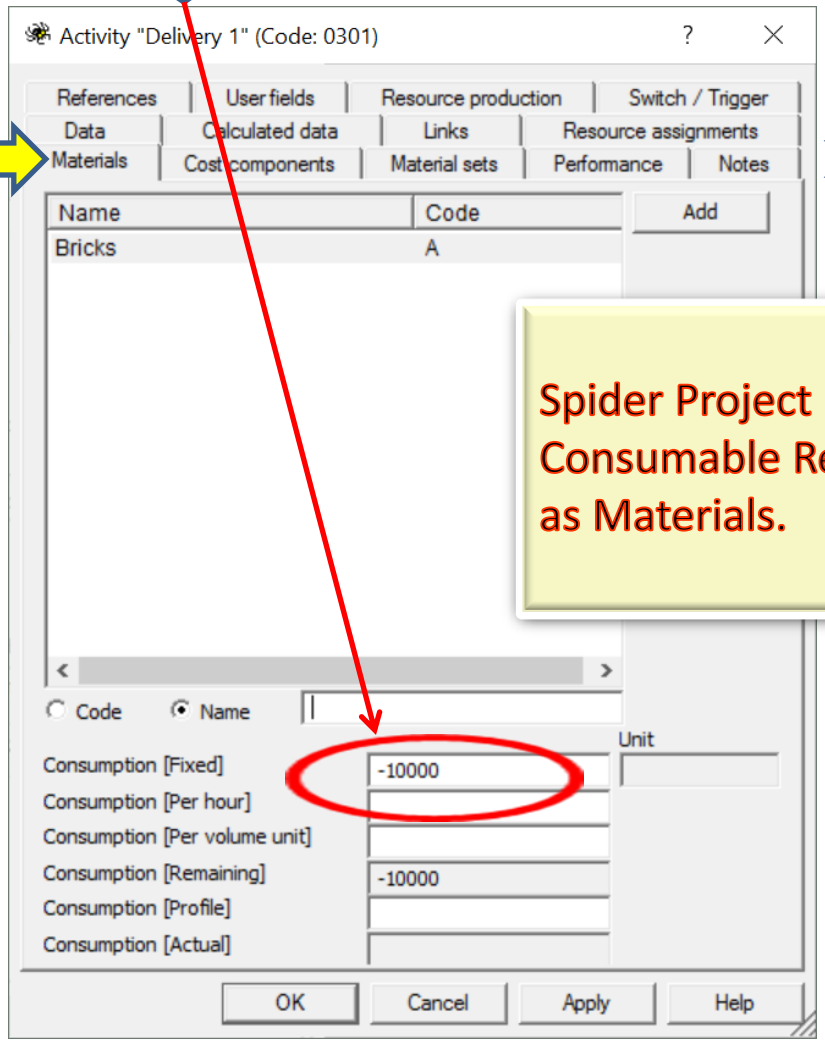
Bricks are to be delivered by barge to a remote island as per available space for each delivery. When bricks become depleted activity progress will be halted until more bricks become available.

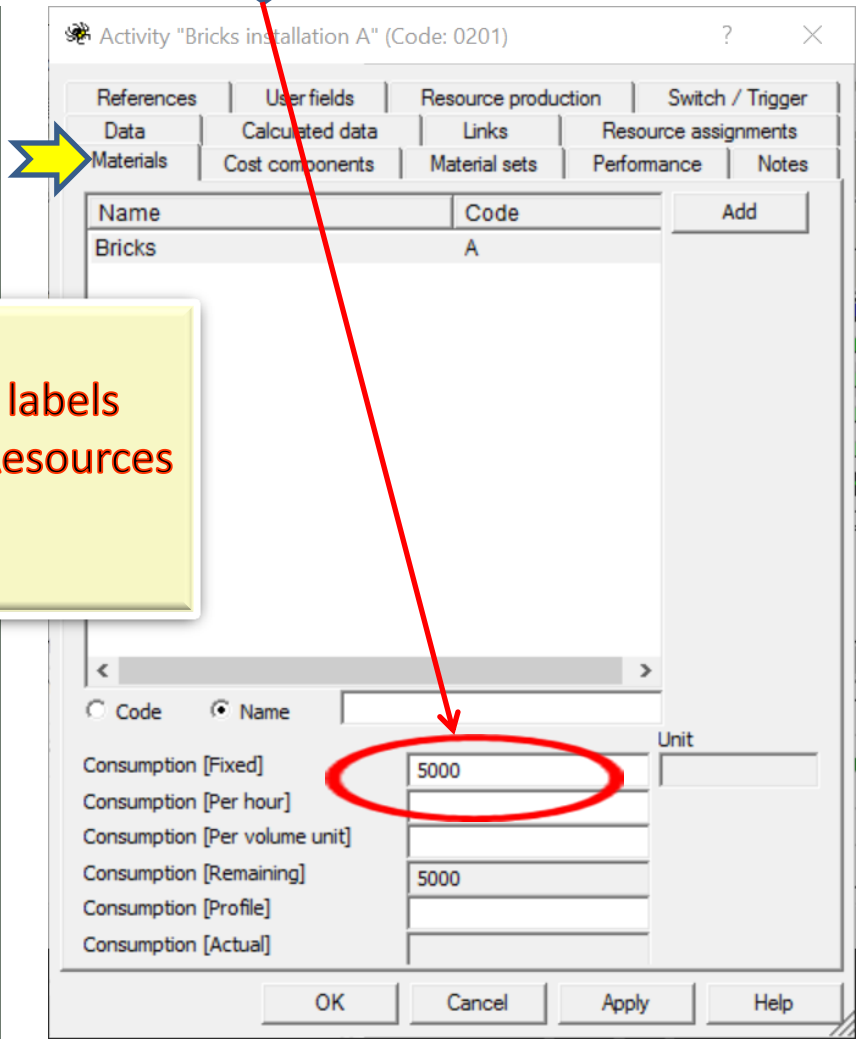
Name	Duration, Days [Cumulativ	Bricks [Cumulative]	Splitt able	Succeeding activities
Bricks Installation	**26.00**			
Buildings A, B & C	**26.00**	**35 000**		
Bricks installation A	5.00	5 000	Yes	
Bricks installation B	10.00	10 000	Yes	
Bricks installation C	20.00	20 000	Yes	
Bricks Deliveries		**-35 000**		
Delivery 1		-10 000	No	0302FS+7 days
Delivery 2		-5 000	No	0303FS+7 days
Delivery 3		-8 000	No	0304FS+7 days
Delivery 4		-12 000	No	



Delivery

Installation





Spider Project labels Consumable Resources as Materials.

<u>Spatial Resources</u>: A spatial resource is occupied from the first moment an activity from a group of activities starts until the finish of all activities from that group.

- Spatial Resources are not understood by many schedulers.
- Common examples within construction schedules are Elevated Slab Flying Forms used in concrete buildings and any equipment to remain in place until a group of activities finish using it such as hoisting equipment and scaffolding.
- Spatial Resources cannot be leveled as Renewable Resources.
- Spatial Resources can be modeled as Consumable Resources.

Modeling of spatial resources using consumable resources essentially can be done with four simple steps.

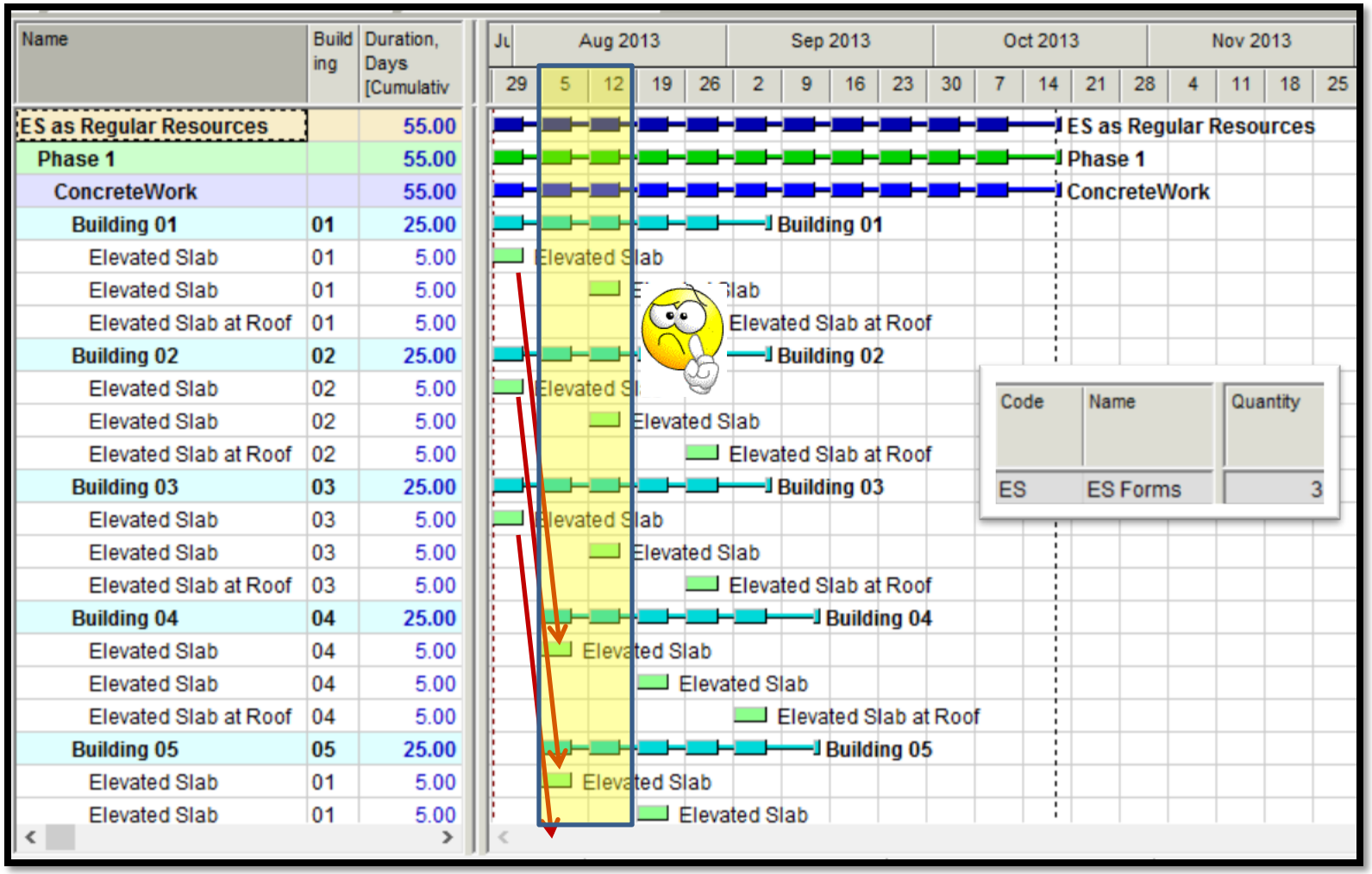
- Produce the required spatial resources using an activity for this purpose.
- Encase the group of activities within two activities as the spatial resource is occupied from the first moment an activity from the group starts until the finish of all activities from that group.
- At the start of group activity consume one unit of the spatial resource.
- At the end of group activity produce one unit of the spatial resource making it available again.

If at any moment all spatial resources are consumed no other start of group activity will be able to access the resource until it is released by an activity that produce spatial resources.

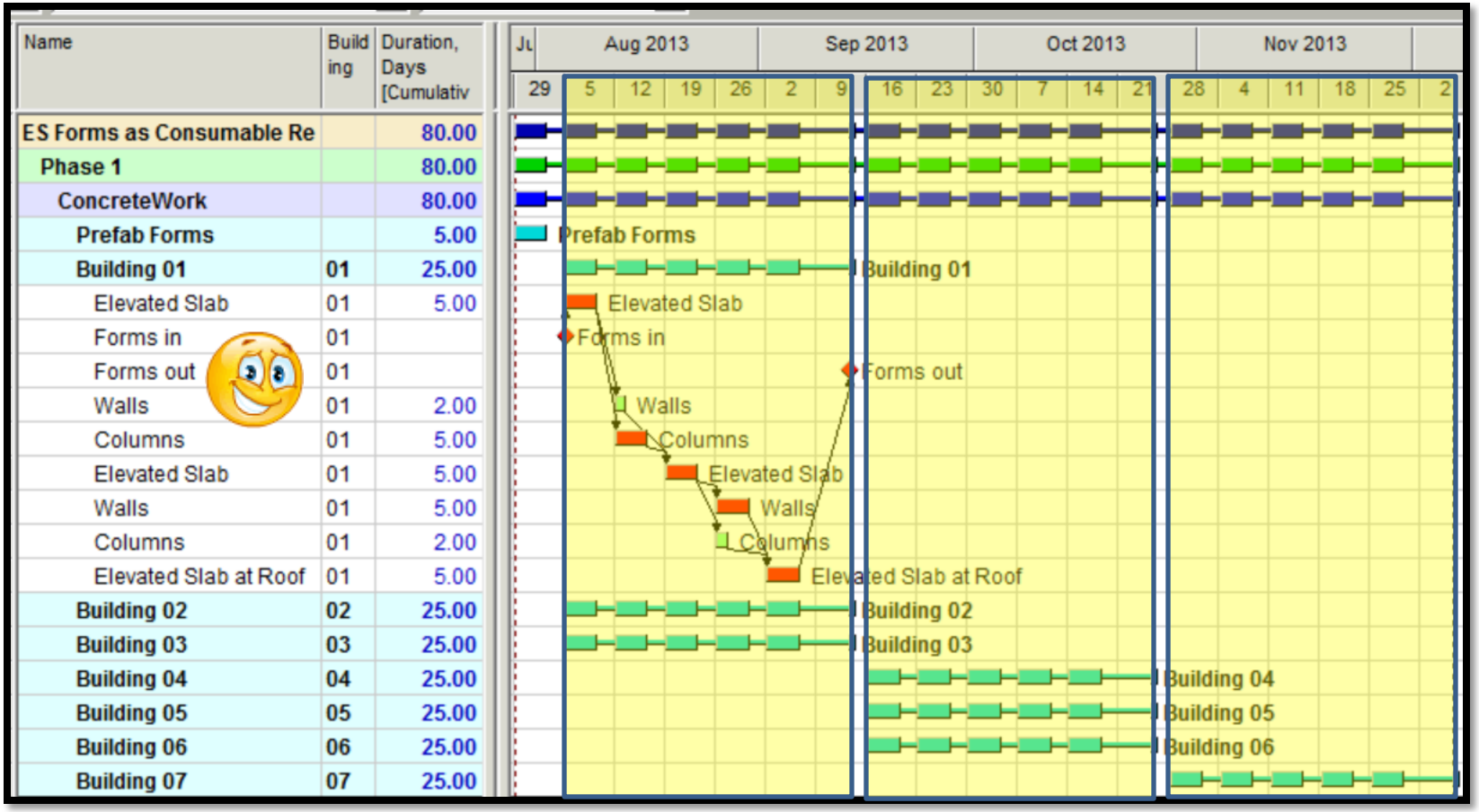
Elevated Slab Forms as Spatial Resources

Elevated Slab Forms are to remain in the building until the concrete have enough strength, they are moved to other slabs within the same building until the building is finished using the forms. Then they can be moved to another building.

Say we have 3 sets of forms that cannot be moved to other building until that building forms are finished. If using renewable resources this requirement will not be enforced.



If using Consumable Resources the resource leveling engine will get it right.



Other examples of planning that require modeling of spatial resources are shop floor spaces and assembly areas such as dry docks in ship manufacturing and repair.

Airplane construction and maintenance schedules must satisfy complex resource constraints.

Because space in the narrow passageways and access is very limited, the scheduling system must also take into account these spatial resources.

Large parts are maintained/assembled in specialized shops that in some cases are at different countries. These shops are also spatial resources.

Available beds on an Offshore Oil Rig is an important constraint that can easily be handled if using spatial resources model.

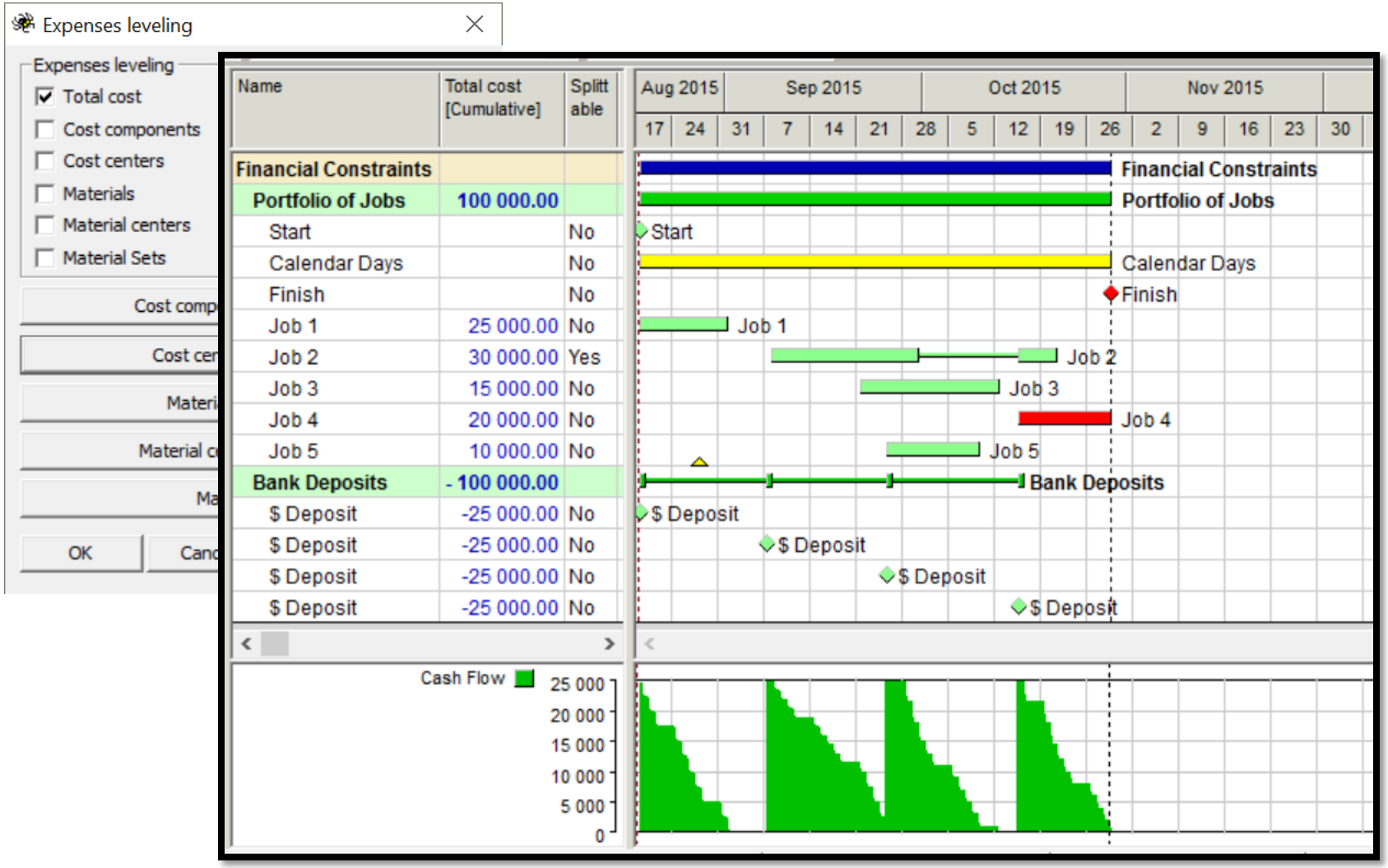
You cannot schedule additional activities if there are not enough beds, some must be delayed until there are enough beds.

Using soft logic is not a practical approach when there are many such links subject to changes.

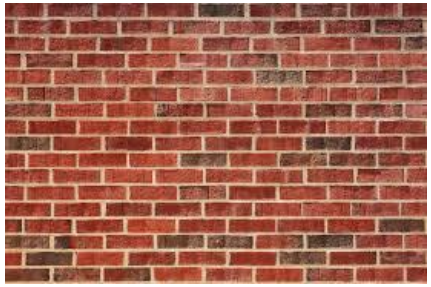
<u>Financial Resources Leveling</u>:

- Project and Portfolio schedules are calculated taking into account financial restrictions delaying activity execution until its completion is financed.
- Any schedule that does not meets financial constraints is unfeasible.

In the lack of financial resources activities/jobs or whole activities will be delayed until more funds become available.



resource quantities
& workloads



volume of work
& production rates

skill-resources

teams

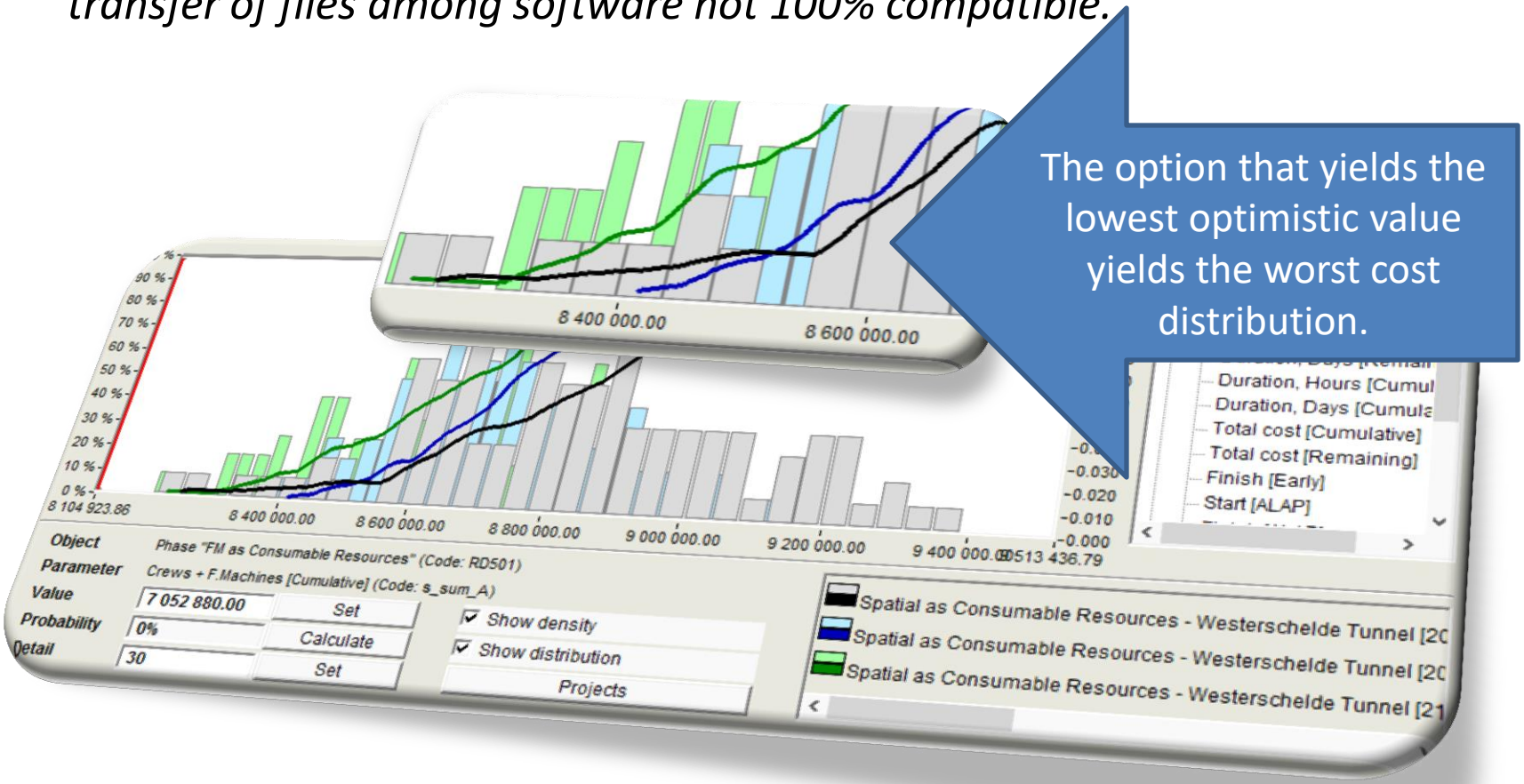
consumable resources
& spatial resources

financial resources

A few resource planning enhancements can get you better schedule models. Just some schedule adjustments you are to do manually when not available within your resource planning tool. It is easy, logical and predictable.

Other things you might be missing.

Project Risk Analysis fully integrated with the software - means no more transfer of files among software not 100% compatible.



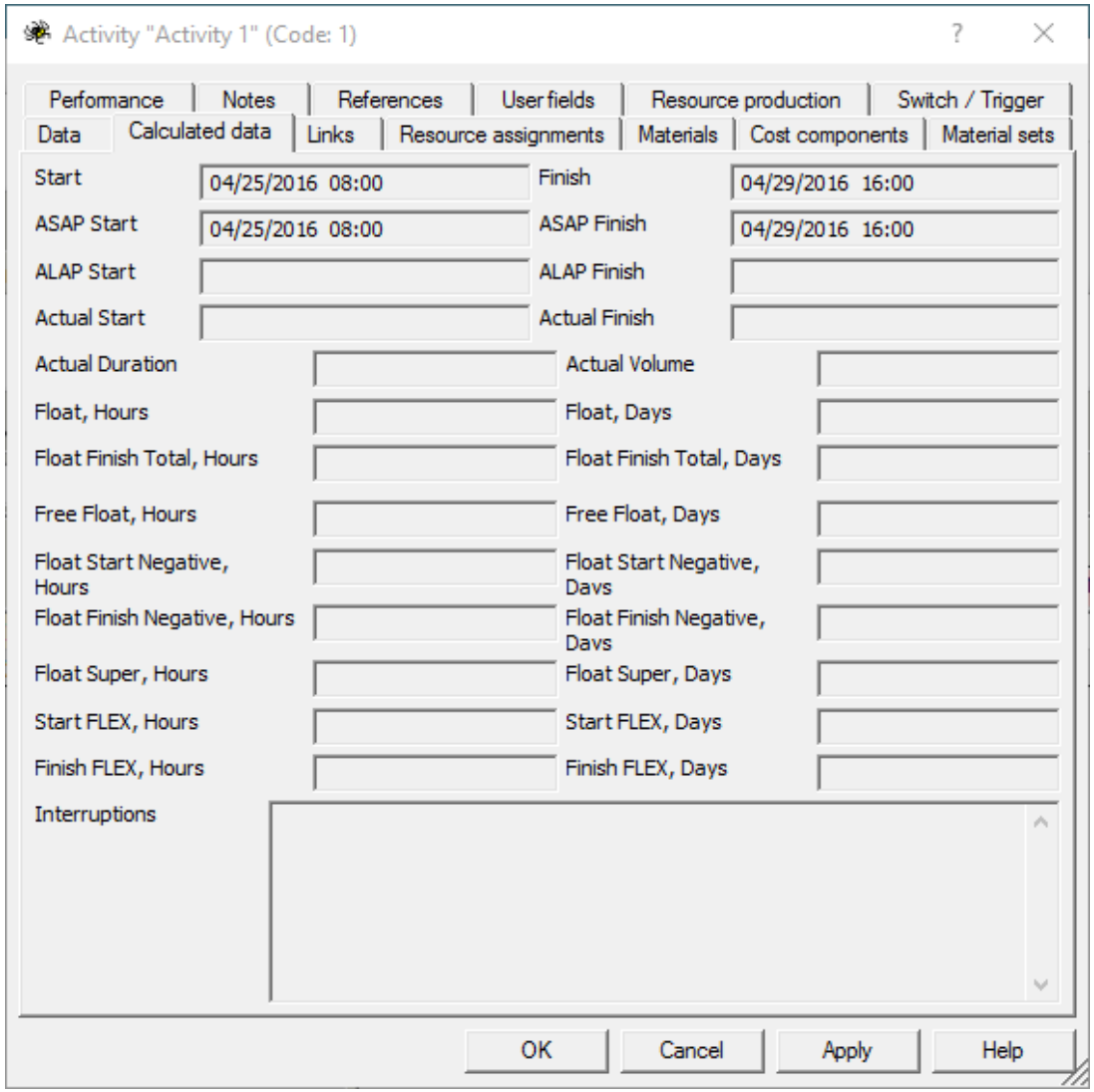
Other things you might be missing.

LINKS TABLE

Preceding activity code	Succeeding activity code	Preceding activity name	Succeeding activity name	Type	Lag type	Lag	Lag unit	Lag calendar	Strict	Broken	Driving	Critical
S1FR	SWFW	Walls formwork remov:	Stairway formwork inst	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWFW	SWRI	Stairway formwork inst	Stairway reinforcement	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWRI	SWCN	Stairway reinforcement	Stairway concreting	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWCN	SWCU	Stairway concreting	Curing (stairway)	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWCU	S2FW	Curing (stairway)	Walls formwork installa	Start-Start	Time	8.00	Hour	Heat	Not earlier than	No	Yes	No
S2FW	S2CN	Walls formwork installa	Walls concreting (stair-	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
S2CN	S2CU	Walls concreting (stair-	Curing (walls, stair-ele	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWCU	SWFR	Curing (stairway)	Formwork removal (sta	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
S2CU	S2FR	Curing (walls, stair-ele	Walls formwork remov:	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
FCNC	FCUR	Floor concreting	Curing (floor)	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
FCUR	FLFR	Curing (floor)	Floor formwork remova	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	Yes
SERI	S1FW	Walls reinforcement (s	Walls formwork installa	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
CLCN	S1CN	Column concreting	Walls concreting (stair-	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
CLFR	IWFR	Column formwork rem	Internal walls formwork	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
EWB2	FFRM	External walls brickwor	Floor formwork installa	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
IWFR	S2FR	Internal walls formwork	Walls formwork remov:	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
SWFR	EWB2	Formwork removal (sta	External walls brickwor	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	No	No
FFRM	FLRI	Floor formwork installa	Floor Reinforcement	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	No
FLRI	FCNC	Floor Reinforcement	Floor concreting	Finish-Start	Time		Hour	2_Sh	Not earlier than	No	Yes	Yes

Very useful to trace logic and filter any link parameter. Also discloses resource dependencies as temporal relationship.

Other things you might be missing.



MULTIPLE FLOAT VALUES

Disclosed values in hours and days, necessary to understand the values when hours per work day are different .

Some such as Start FLEX are necessary to identify and quantify Lag Drag.

Other things you might be missing.

- ✓Multiple [unlimited] WBS Structures
- ✓Resource Gantt & Materials Gantt
- ✓Integrated Trend Analysis
- ✓Time Location Charts
- ✓Disclosure of Resource Dependencies
- ✓Portfolios with Resource Constraints
- ✓Portfolio Risk Analysis
- ✓Unlimited number of database files
- ✓Transfer of access rights at file level
- ✓A Free Viewer
- ✓Scripts and automatic e-mail notifications
- ✓Multiple resource leveling algorithms
- ✓Investment analysis tools
- ✓It takes less than 4 minutes to full download and install
- ✓and many others …

- Spider Project Software is a scalable application at very competitive prices.
- Spider Project Desktop Plus at $2,000 for first purchase will provide most users with all they will ever need.
  - This version includes integral Project Risk Analysis and Links Table functionality that in most other software might be a separate application at a cost over $9,000 such as PRA + $3,000 for additional software for a view to the Links Table. If the other software costs $3,000 this will add up to a whooping $15,000 per user and still you will be missing the enhanced resource planning functions.
  - The top version, Spider Project Professional can be used on shared portfolio environment where a combination of versions might be a better choice.

SPIDER PROJECT TEAM

To download Spider Demo, for purchasing or more information you can contact Spider Team at:

http://www.spiderproject.com/

If you want to explore the scenarios on this presentation and any other using Spider Project or Spider Demo and you need assistance you can find us at Planning Planet Forum

http://www.planningplanet.com/forum