Vladimir Liberzon

Spider Project

INTRODUCTION

Spider Project Introduction

Spider Project is a powerful professional project management software developed in Russia. The first SP version was launched in 1993 and since then it has been constantly improved. The current Version 11 is used in 34 countries.

Spider Project is an integrated software that contains everything useful for good project and portfolio management. It supports all traditional methods and tools, and offers unique approaches and functions that have no analogues in other software packages.

Spider Project is the only PM software that optimizes resource, cost, and material constrained schedules and budgets for projects and portfolios.

Spider Project Introduction

The unique features of Spider Project include:

- ✓ Quantity Based Scheduling
- ✓ Application and Management of Corporate Norms
- ✓ Conditional Scheduling
- ✓ Skill Scheduling
- ✓ Cost and Material Leveling
- ✓ Resource Critical Path Calculation
- ✓ Resource-constrained Schedule Optimization
- ✓ Cash and Material Flow Calculation and Management
- ✓ Management of project archives and Trend Analysis
- ✓ Quantitative Risk Analysis that takes into account all existing constraints

Spider Project Introduction

The unique features of Spider Project include:

- ✓ Calculation and Analysis of Success Probability Trends
- ✓ Management of Project Time and Cost Buffers
- ✓ Portfolio management taking into account project priorities and all existing constraints
- ✓ Multiple WBS, RBS, MBS
- ✓ Management of Parallel Budgets
- ✓ Line of Balance Reporting
- ✓ and many others.

Spider Project Introduction

This presentation is an Intro to Spider Project.

We will show how new Spider Project users create their first project and knowledge bases that may be used in future projects.

We will use a sample project that will be created step by step.

Your participation in this process will be highly appreciated.

Please do not hesitate to interrupt me at any time to ask questions.

Spider Project Introduction

Spider Project installation is easy: run the installation program and answer one question only – select a folder to install the software.

The whole process takes less than five minutes.

No external software is needed, just any version of Windows.

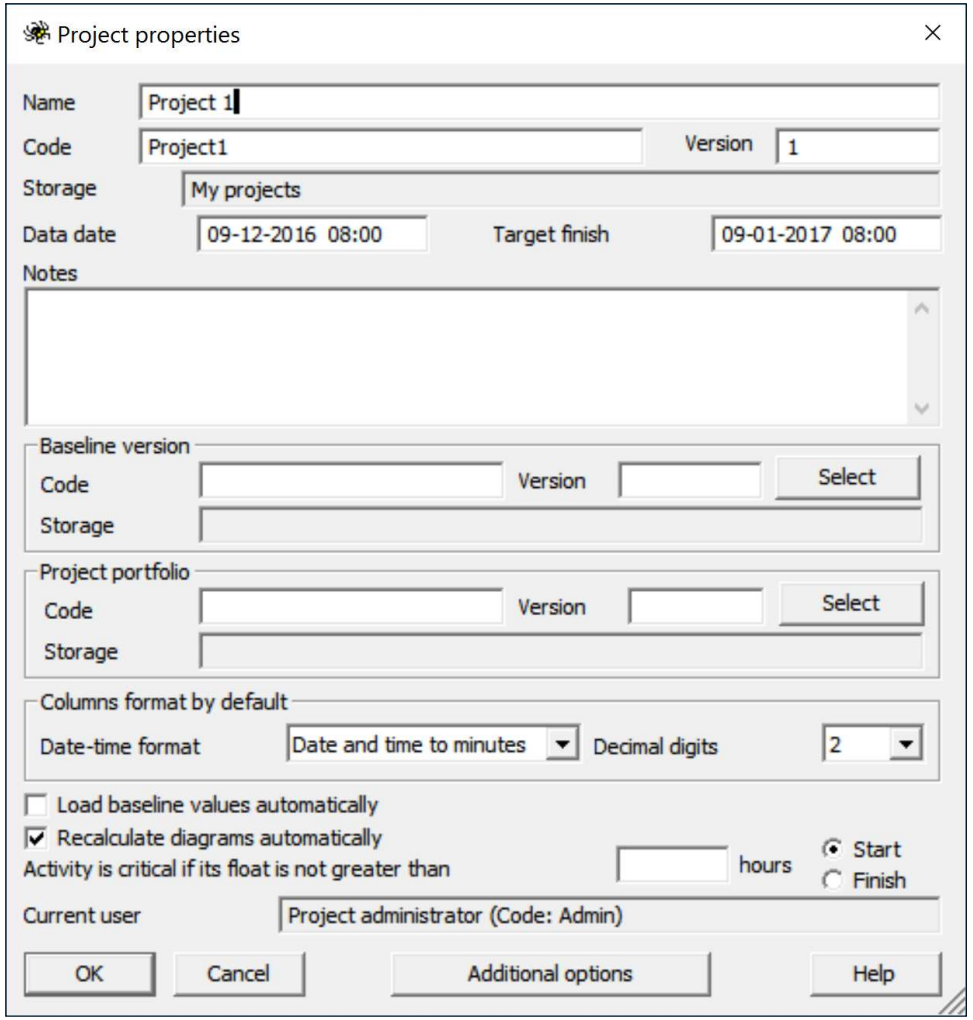
In five minutes you will be ready to manage projects and portfolios of any size and complexity.

Step 1. Create Project

Select menu item "Create a new project" and enter its name, code, start date and required finish date (used for backward scheduling).

Here you may also define project baseline, project date format and the default number of decimal places. However, this can be done later.

Press OK and go to the project's Activity Gantt Chart.



Step 1.

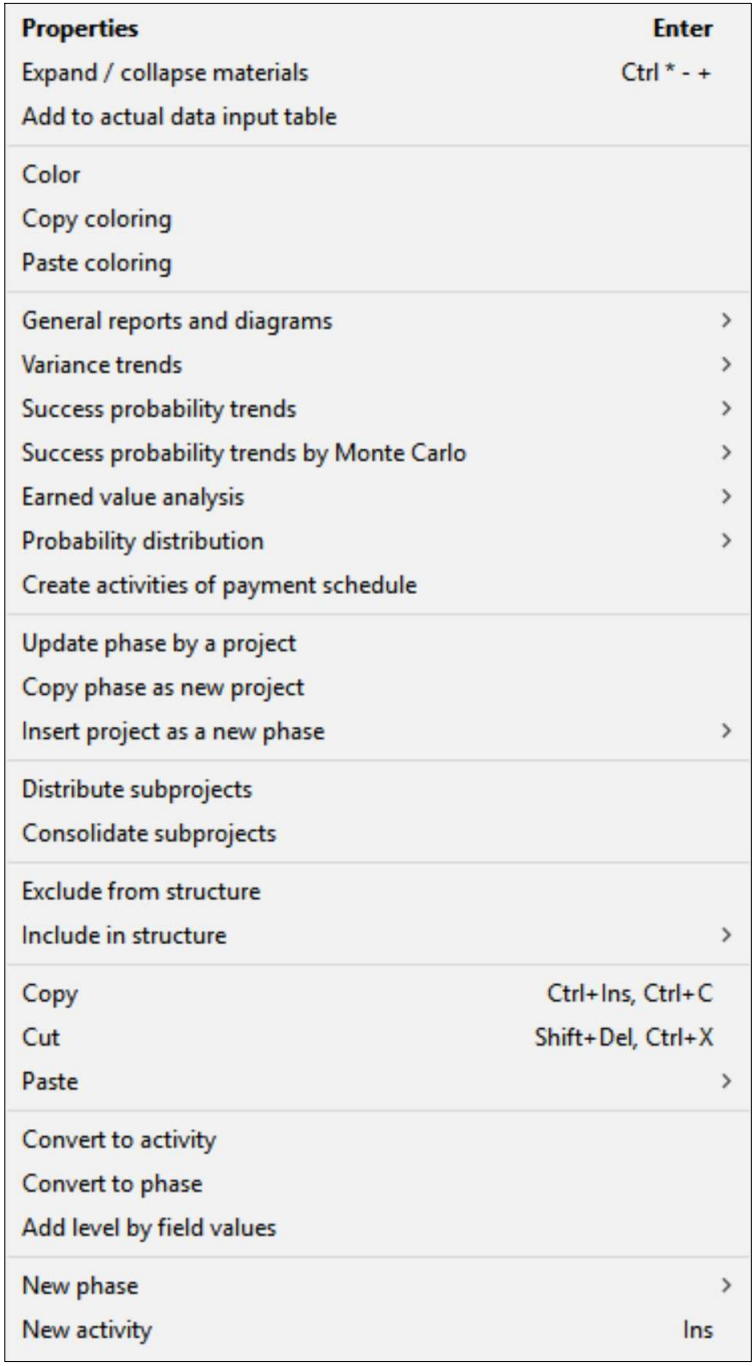
A key to working with Spider Project is right mouse click:

Any object properties and menus will appear after right mouse-clicking on the object row number or Gantt Chart bar.

This is the pop-up menu for any project phase (WBS element).

You can select what can be done with this object and what reports on this object to show.

There are also the shortcut keys for usual tasks.



Step 2. Create main WBS

The development of a project model usually starts with creating WBS.

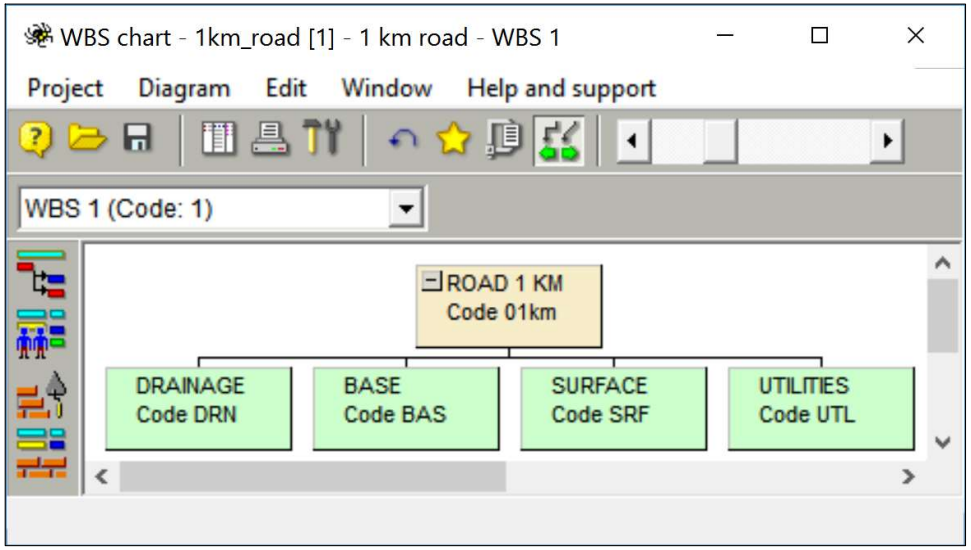
Our project consists of 4 phases:

Drainage

Base

Surface

Utilities



The project WBS can be created in the Gantt Chart or using WBS Chart.

Spider Project permits to create multiple WBS for the same project.

Examples: Deliverable WBS, Process WBS, Responsibility WBS, Contract WBS, etc.

Step 3. Create project activities

It may be done by opening the phase menu or using Ins key.

We suggest to follow the following rules for creating activities:

1. Activity must be measurable in physical units for planning and monitoring its amount of work. We call it Activity Volume.
2. Activity should be performed by the same resource team from start to end.
3. Activity should belong to one work package only.
4. If activity duration exceeds one week (usual period for performance analysis) its volume of work should be easily measurable.

Step 3. Create project activities

There are following types of activities in Spider Project:

1. Duration (initial information is activity duration that does not depend on assigned resources)

2. Productivity (initial information is activity volume of work and duration is calculated after total productivity of assigned resources is known)

3. Hammock (activity lasts from one event to another)

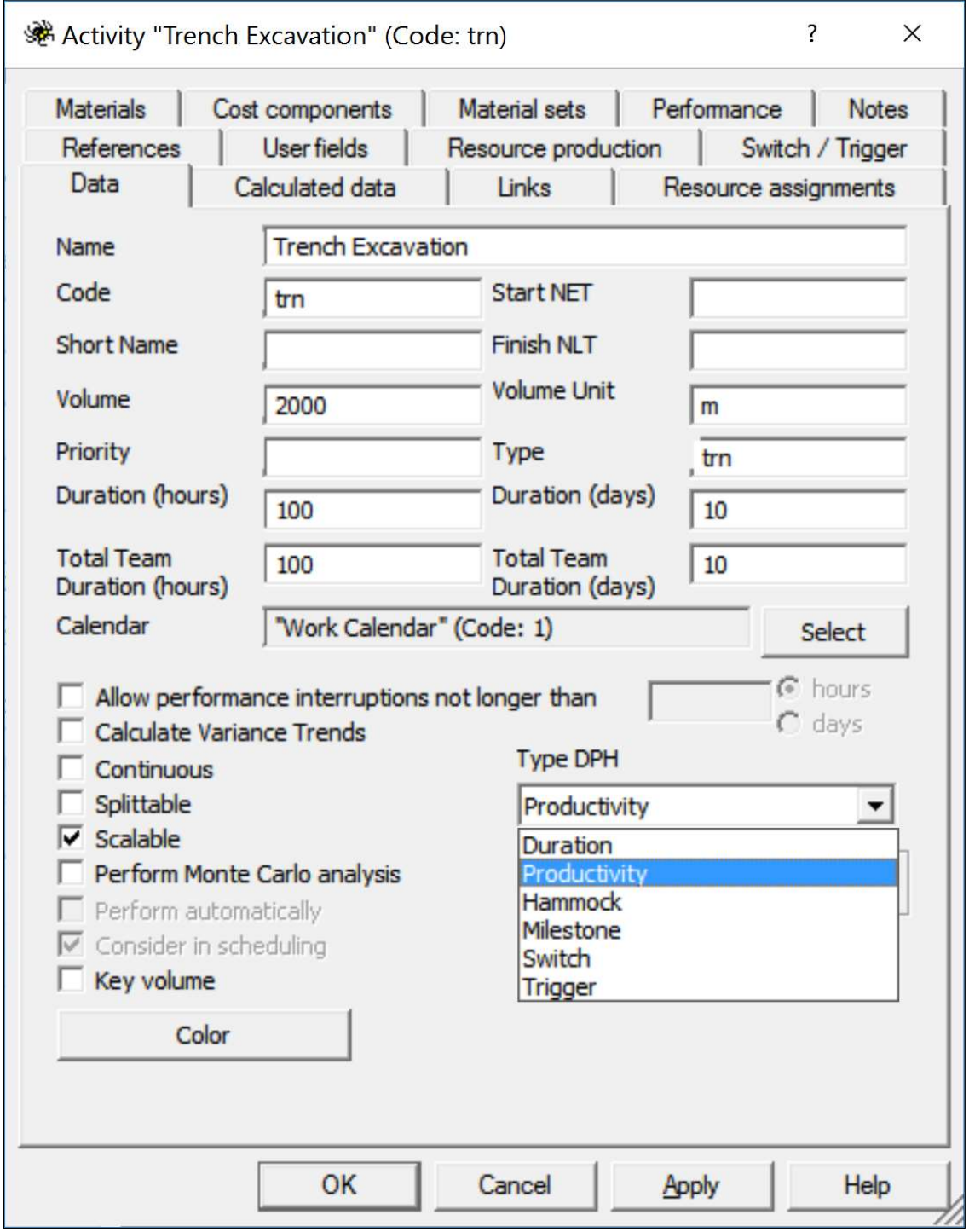
4. Milestone: zero duration activity which is an event

5. Switch (zero duration activity that has two positions, Yes and No. Positions may depend on user-defined conditions. If Yes, one branch of the network is selected, if No, another. We call it conditional scheduling)

Step 3. Create project activities

6. <u>Triggers:</u> activities representing risk events that may happen with user-defined probabilities. If a trigger occurs, the project may proceed in different ways, each with its own probability.

Triggers are used in Monte Carlo risk analysis. In deterministic scheduling, certain positions of triggers are selected.



Step 3. Create project activities

In the construction projects, most activities are of the Productivity type. Their duration is defined by the productivity of assigned resources.

An example of Duration type activity is concrete curing or activities performed by contractors.

We have entered our project's activities and their respective volumes of work.

Lev	Name	DPH type	Volume [Remaining]	Unit of vol
1	ROAD 1 KM			
2	DRAINAGE			
	Drainage Layout	Productivity	5 000.00	m2
	Drainage system construction	Productivity	4 000.00	m
	Retention Pond	Productivity	2 000.00	m3
2	BASE			
	Sand and Crush Stone Transportation	Duration	23 900.00	m3
	Road Layout	Productivity	12 000.00	m2
	Trench Excavation	Productivity	2 000.00	m
	Sand Bed	Productivity	10 000.00	m3
	Stone Bed	Productivity	10 000.00	m3
2	SURFACE			
	Prime Coat	Productivity	12 000.00	m2
	Black Base	Productivity	12 000.00	m2
	Tack Coat	Productivity	12 000.00	m2
	Bituminous Concrete Surface Wearing Course	Productivity	12 000.00	m2
2	UTILITIES			
	Roadsides	Productivity	6 000.00	m2
	Marking-out	Productivity	1 000.00	m
	Traffic signs	Productivity	3.00	pc
	Barriers	Productivity	2 000.00	m
	Finish	Milestone	100.00	

Step 4. Define cost structure

Now let's define project cost components. If some of these use different currencies, you must enter the respective exchange rate in their unit cost.

Cost components may be calculated using the formulas such as indirect cost in our example.

Cost components may be included in the cost centers. In particular, we will create the cost center Expenses to compare the internal cost with the contract cost for the same activities.

	Code	Name	Unit cost	Formula
1	mtc	Material Cost	1.00	
2	mcc	Machine Cost	1.00	
3	lbc	Labour Cost	1.00	
4	inc	Indirect Cost	1.00	("Cost:lbc" + "Cost:mtc" + "Cost:mcc")*1.18
5	ext	External services	1.00	
6	cnc	Contract Cost	1.00	

	Code	Name	Include material consumption	Include material income
1	E	Expenses	Yes	Yes
2	C	Contract Cost	Yes	Yes

Step 5. Define project materials

	Code	Name	Material Cost [Unit cost]	Discrete cons	Backload consumption
1	Fuel	Fuel	5.70	No	No
2	Bitm	Bitumen	4.80	No	No
3	CrSt	Crush Stone	9.00	No	No
4	Sand	Sand	9.00	No	No
5	Asph	Asphalt	48.00	No	No
6	Pnt_	Paint	67.00	No	No
7	Stl_	Steel	1 200.00	No	No
8	Sign	Sign	650.00	Yes	No

Some of these will be assigned to project activities, others (like fuel) will be used by renewable resources (machines) to do their work.

Materials can be consumed continuously or discretely (like road signs) – we cannot install one half of the road sign.

Like cost components, materials can be combined into the material centers. It is not required in our project but can be useful in some projects. You may need to have the reports generated for material groups such as *all pipes* if different pipes are used.

Step 6. Define Resources

Now we can define project resources and enter their available quantities.

Initial quantities may be adjusted after the project schedule is calculated.

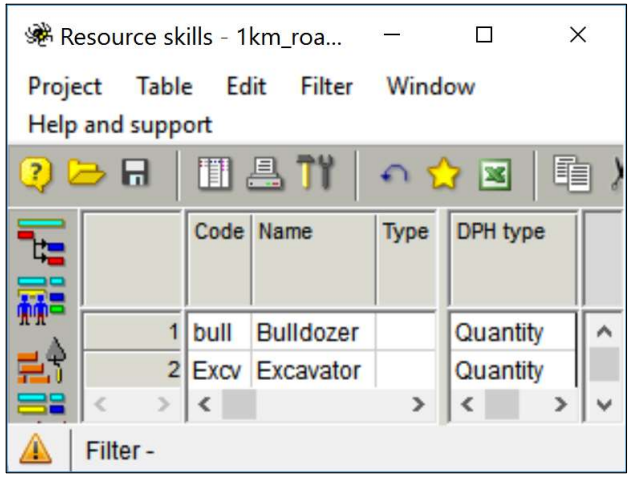
In our project, machines consume fuel.

For labor resources, per-hour cost is entered as labor cost component; for machines, the costs of work are entered as Machine cost component.

Suppliers do not have per-hour costs. A supplier's cost is defined by the contract as assignment cost (fixed or per work volume unit).

Code	Name	Quantity	Fuel [Per hour]	Labour Cost [Per hour]	Machine Cost [Per hour]
grd	Grader	2	15.00		50.00
bld	Bulldoser	1	20.00		50.00
bl1	Bulldoser 1	1	18.00		45.00
scr	Scraper	2	20.00		70.00
exc	Excavator	1	25.00		60.00
ex1	Excavator 1	1	22.00		50.00
mcl	Machinist	9		40.00	
wrk	Worker	8		30.00	
trc	Truck	9	15.00		35.00
drv	Driver	9		35.00	
spl	Supplier	1			
vbr	Vibroroller	2	20.00		60.00
btd	Bitumen distributor	1	15.00		35.00
asp	Asphalt paver	1	20.00		80.00
rrl	Road-roller	2	20.00		50.00
spc	Special Car	1	10.00		40.00

Step 7. Define Skills



Our project uses two different excavators and two different bulldozers.

They can do the same work although with different productivities and costs.

We have to choose which of these to assign and our choice can be wrong. Before scheduling, we don't know which resources will be available at any given moment. An activity may be delayed because the required resource is busy on another activity while other resources with the required skill are available.

Therefore we will define the <u>resource skills</u> (excavator and bulldozer) and assign skills rather than concrete resources.

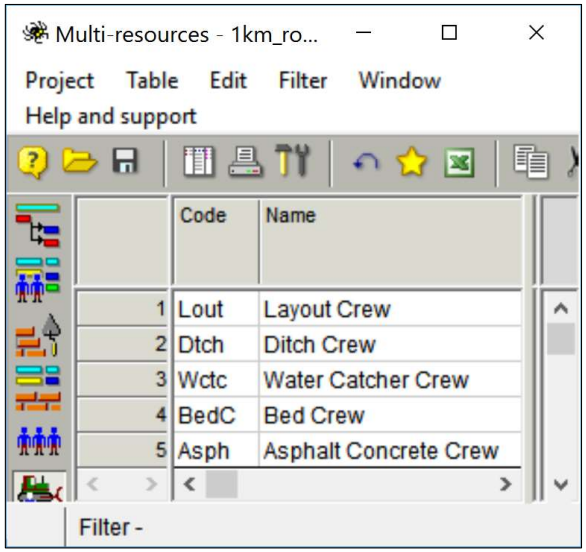
Spider Project selects which resource to use on particular activities in the course of resource-constrained scheduling, based on their availability, productivity, and cost.

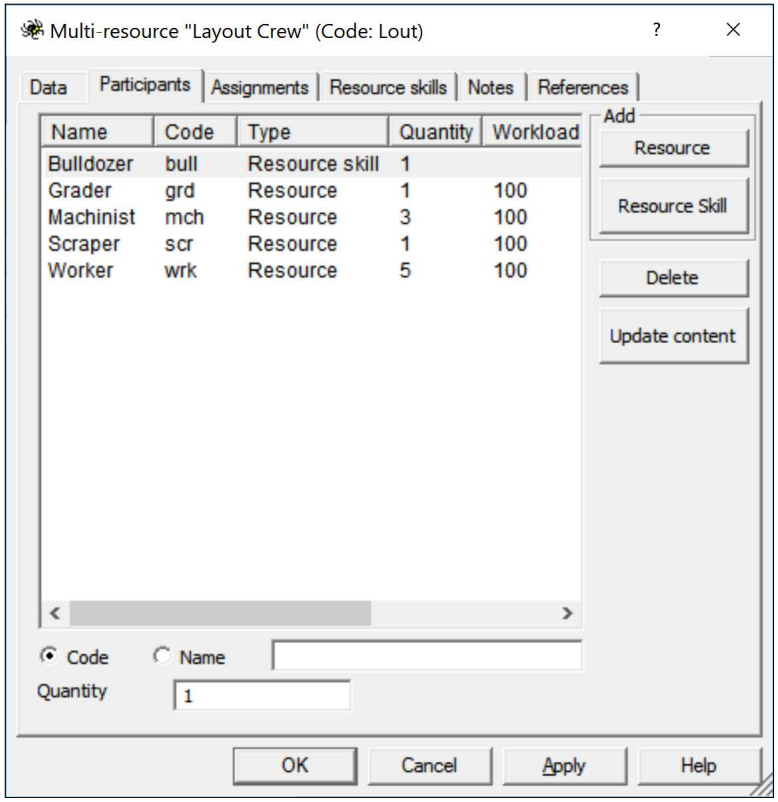
Step 8. Define Crews

Now we proceed to create the construction crews and then assign these crews to project activities.

Crews may include Skills and we will know who will do what only after project leveling.

The crew resources may be changed at any moment and it will change all future resource assignments if Update Content is selected.





Step 9. Assign Resources

Now, the crews (called multi-resources) may be assigned to project activities.

Assigning a multi-resource (crew), we assign all resources and skills that belong to the assigned multi-resource.

Using multi-resources makes resource assignment process and what-if evaluations much easier.

Lev	Name	Quantity
2	DRAINAGE	
	Drainage Layout	
	Layout Crew	1
	Grader	1
	Machinist	3
	Worker	5
	Scraper	1
	Bulldozer	1
	Drainage system construction	
	Ditch Crew	1
	Truck	3
	Machinist	3
	Worker	2
	Scraper	1
	Driver	3
	Grader	1
	Excavator	1
	Retention Pond	
	Water Catcher Crew	1
	Driver	3
	Truck	3
	Machinist	2
	Worker	1
	Bulldozer	1
	Excavator	1

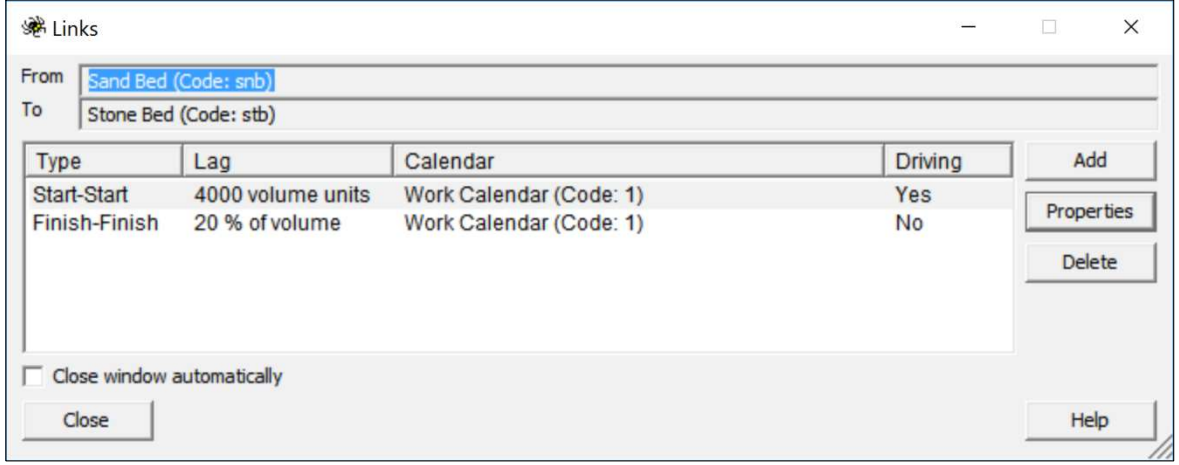
Step 10. Define Resource Productivity

Usually productivities are assigned to the main (driving) resources although in some cases productivities may be defined for the whole crews (multi-resources).

In our sample project, the software will select the excavators and bulldozers that will work on different crews and this selection will determine the crew's productivity and the respective activity duration.

Lev	Name	Quantity	Productivity
	Worker	5	
	Scraper	1	105.00
	Bulldozer	1	
	Drainage system construction		
	Ditch Crew	1	
	Truck	3	
	Machinist	3	
	Worker	2	
	Scraper	1	
	Driver	3	
	Grader	1	
	Excavator	1	
	Excavator	1	32.00
	Excavator 1		27.00
	Retention Pond		
	Water Catcher Crew	1	
	Driver	3	
	Truck	3	
	Machinist	2	
	Worker	1	
	Bulldozer	1	
	Excavator	1	
	Excavator		32.00
	Excavator 1	1	27.00

Step 11. Define Dependencies

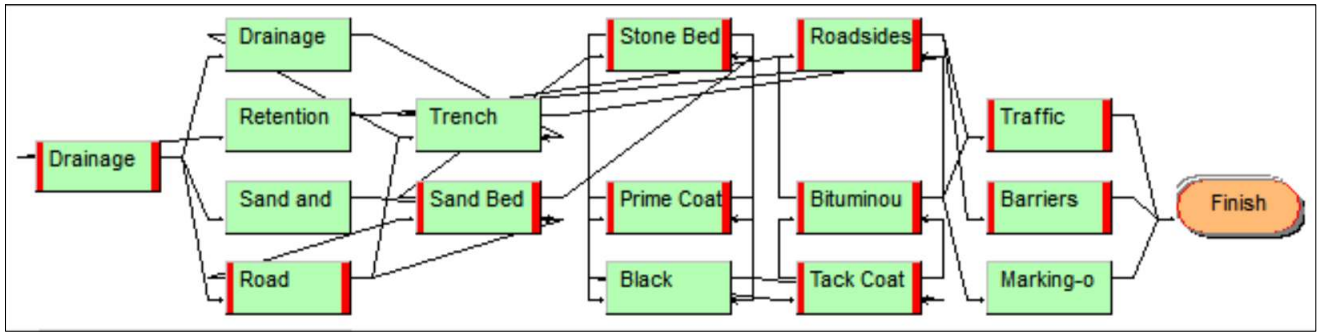


Spider Project supports all standard types of activity dependencies as well as additional strict and double dependencies.

In Spider Project, you can define Time lags and Volume lags (in volume units or as percentage).

For Time lags, it is possible to define special lag calendars.

The number of links between any two activities is not limited.



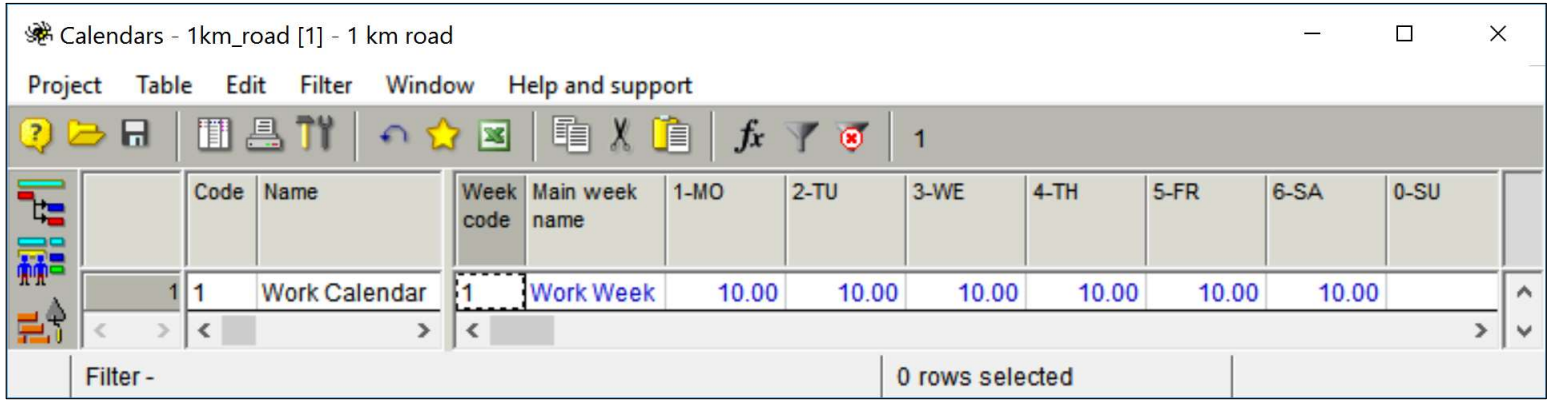
Step 12. Define Calendars

In Spider Project, calendars must be assigned to activities, resources, dependency lags and project phases.

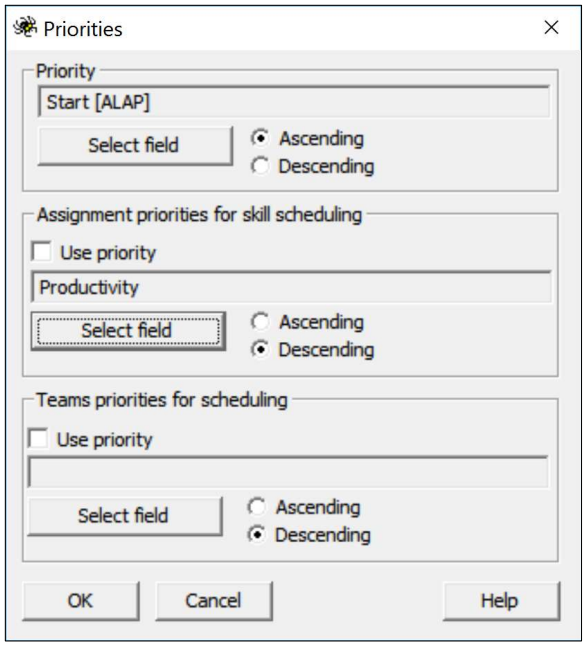
A time will only be regarded as working time if defined as such in both activity and assigned resource calendars.

Calendars must be created and then assigned to project objects.

Our project is simple and uses one 6 days, 10 work hours per day calendar only .



Next Steps



We are almost ready for scheduling.

Almost, because we have assigned resource skills but the selection of a concrete resource may depend on resource cost.

In Spider Project, default skilled-resource selection priority is activity cost – Spider Project selects the resources with the required skill that will do the work cheaper.

However, Spider Project users may set other priorities, e.g. maximum crew productivity.

Step 13. Define activity and assignment costs

In our sample project, the expenses depend on resource and material costs, but the contract cost is assigned directly.

Activity cost may be assigned as fixed, as in our project, per-hour cost or per volume unit cost.

Besides, we have set the supplier cost as assignment cost and will pay the supplier for each volume unit.

Code	Name	Contract Cost [Fixed]
drl	Drainage Layout	90 000.00
drc	Drainage system construction	380 000.00
pnd	Retention Pond	180 000.00
str	Sand and Crush Stone Transportation	
snb	Sand Bed	375 000.00
stb	Stone Bed	450 000.00
rlt	Road Layout	225 000.00
blb	Black Base	225 000.00
srf	Bituminous Concrete Surface Wearing	225 000.00
ct2	Tack Coat	50 000.00
ct1	Prime Coat	50 000.00
rds	Roadsides	125 000.00
mrk	Marking-out	20 000.00
trs	Traffic signs	6 000.00
trn	Trench Excavation	330 000.00
brr	Barriers	325 000.00
fin	Finish	

Name	Unit of vol	External services [Per volume unit]
ROAD 1 KM		
DRAINAGE		
BASE		
Sand and Crush Stone Transportation	m3	
Supplier	m3	8.50
Road Layout	m2	
Trench Excavation	m	
Sand Bed	m3	
Stone Bed	m3	
SURFACE		
UTILITIES		

Step 14. Assign materials

Materials may be assigned the same way: to activities, resources, and assignments. We have assigned materials to activities per work volume unit. Fuel was already assigned when we entered the resource data.

Lev	Name	Unit of vol	Asphalt [Per	Bitumen [Per	Crush Stone [Per	Paint [Per volu	Sand [Per volu	Sign [Per volu	Steel [Per volu	Fuel [Per volu
1	ROAD 1 KM									
2	DRAINAGE									
	Drainage Layout	m2								
	Drainage system construction	m								
	Retention Pond	m3								
2	BASE									
	Sand and Crush Stone Transportation	m3								
	Road Layout	m2								
	Trench Excavation	m								
	Sand Bed	m3					1.00			
	Stone Bed	m3			1.30					
2	SURFACE									
	Prime Coat	m2		0.25						
	Black Base	m2	0.12							
	Tack Coat	m2		0.25						
	Bituminous Concrete Surface Wearing Course	m2	0.12							
2	UTILITIES									
	Roadsides	m2			0.15					
	Marking-out	m				0.10				
	Traffic signs	pc						1.00		
	Barriers	m							0.05	
	Finish									

Step 15. Schedule!

Now we are ready for resource-constrained scheduling:

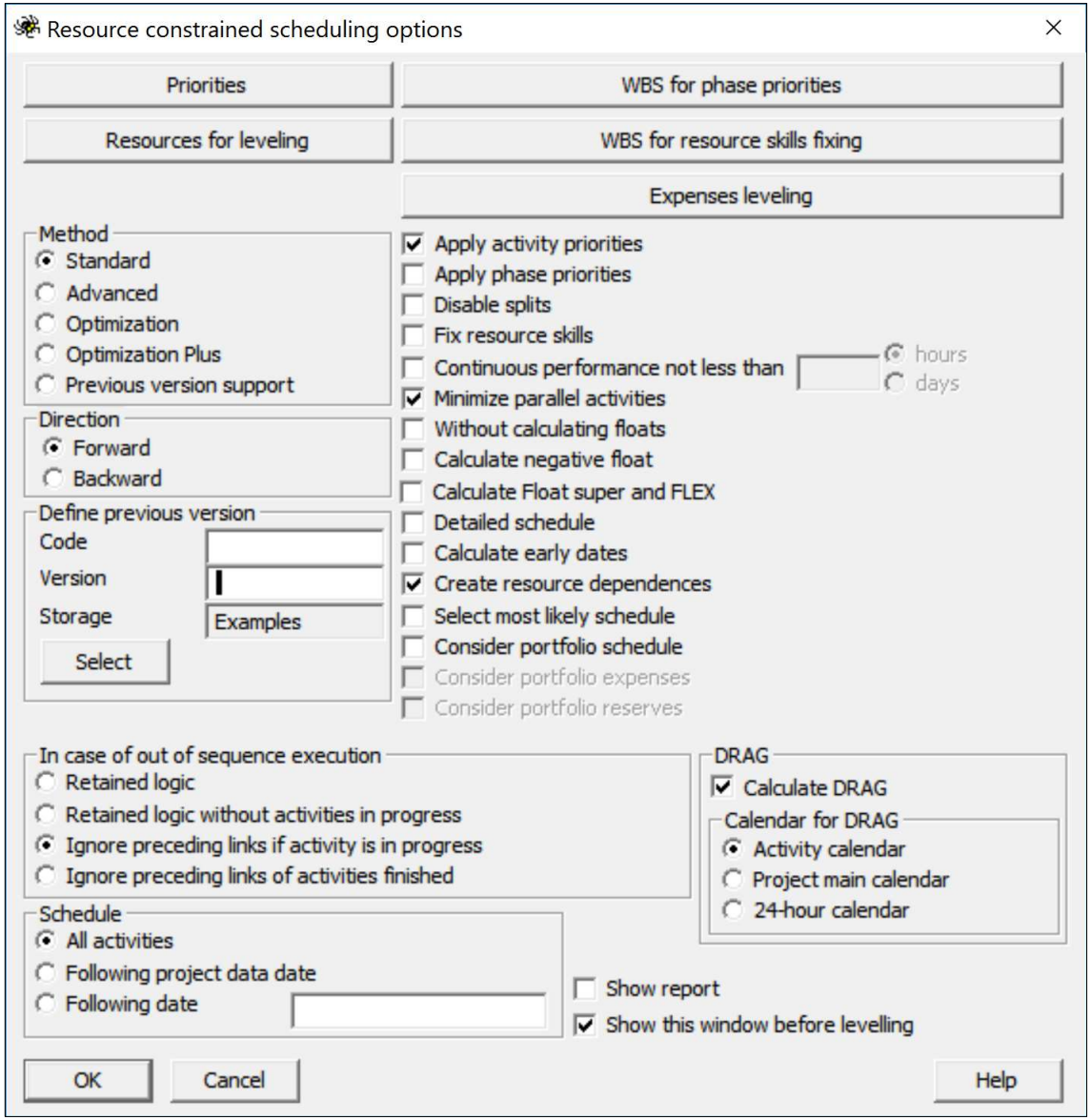
- We have defined project activities, resources, and materials
- We have created and assigned resource skills and crews
- We have assigned materials to project activities and resources
- We have defined activity, resource, materials, and assignment costs
- We have defined activity dependencies
- We have defined activity, resource and lag calendars
- We have entered project constraints (in our case it is resource availability)

Let’s schedule!

Step 15. Resource-constrained scheduling options

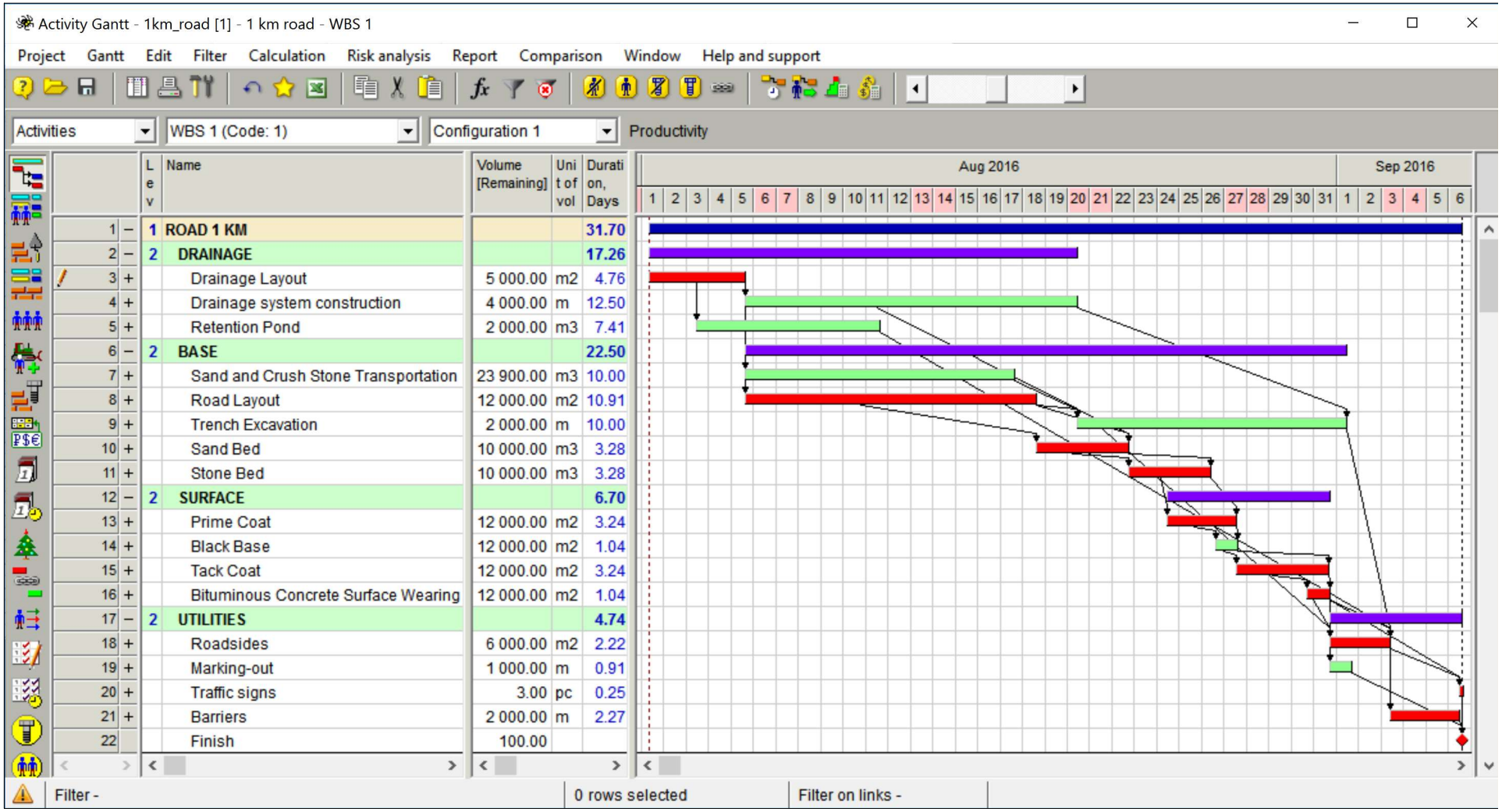
Spider Project offers many scheduling options, including the unique resource-constrained schedule optimization.

The Standard method implies manual selection of leveling priorities while Optimization Plus will find the best possible schedule for our project automatically.



Project Schedule

Spider Project optimizes project schedule and calculates Resource Critical Path.

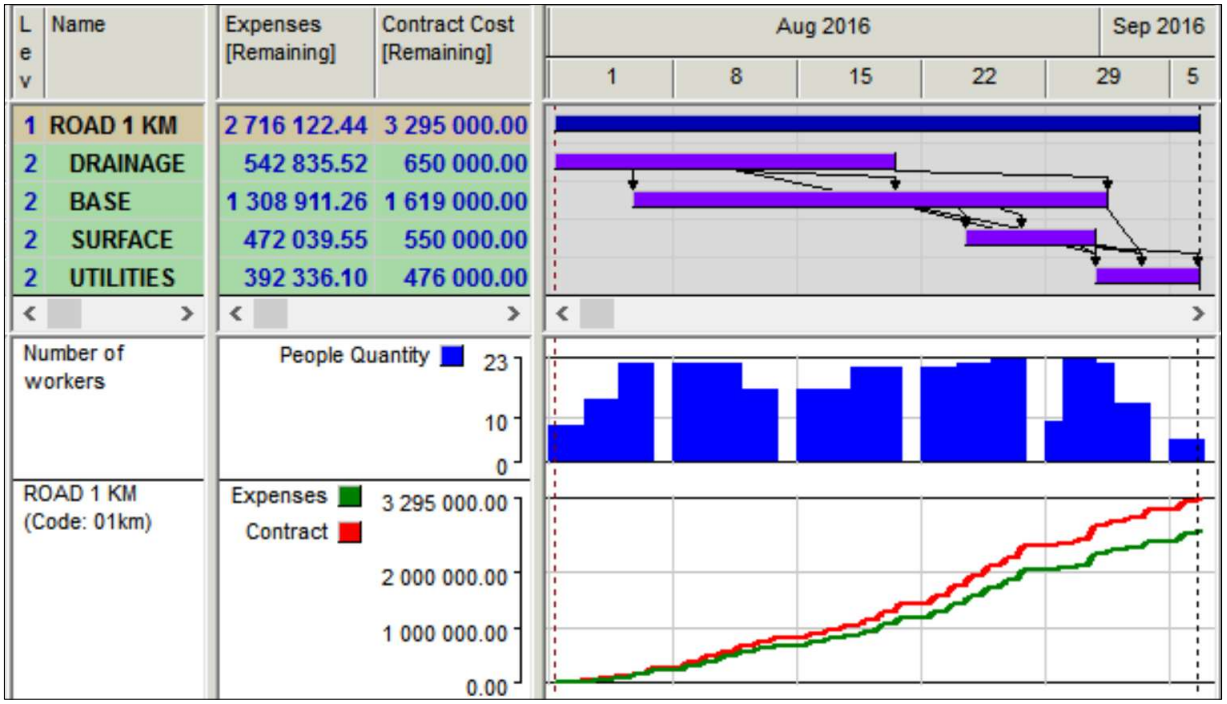


Project Budget

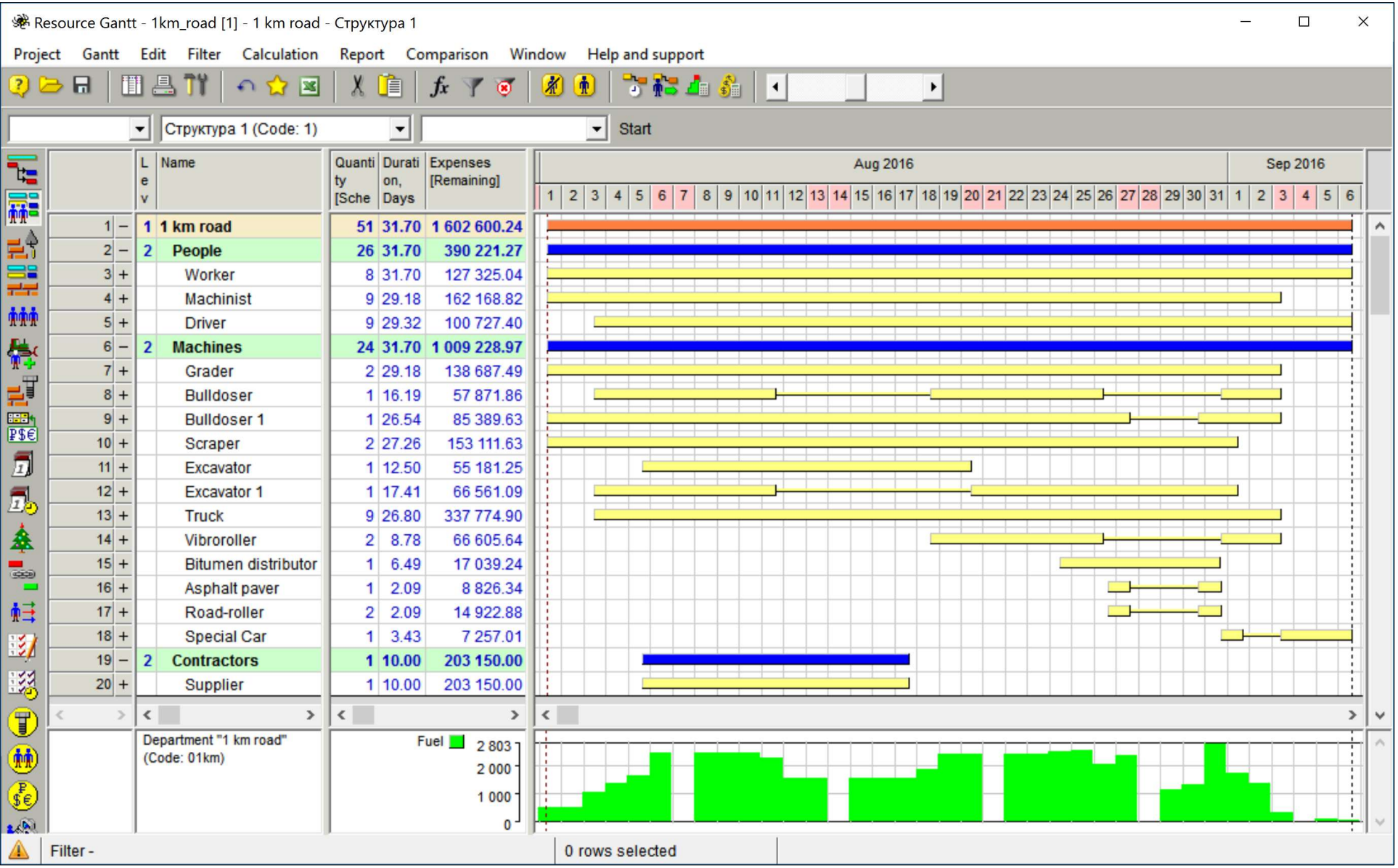
Project budget was calculated together with project schedule.

With two parallel budgets, the Internal budget (Expenses) and the Contract budget, we can forecast and control future profits.

Resource requirements were also calculated and may be adjusted if resource availability changes.

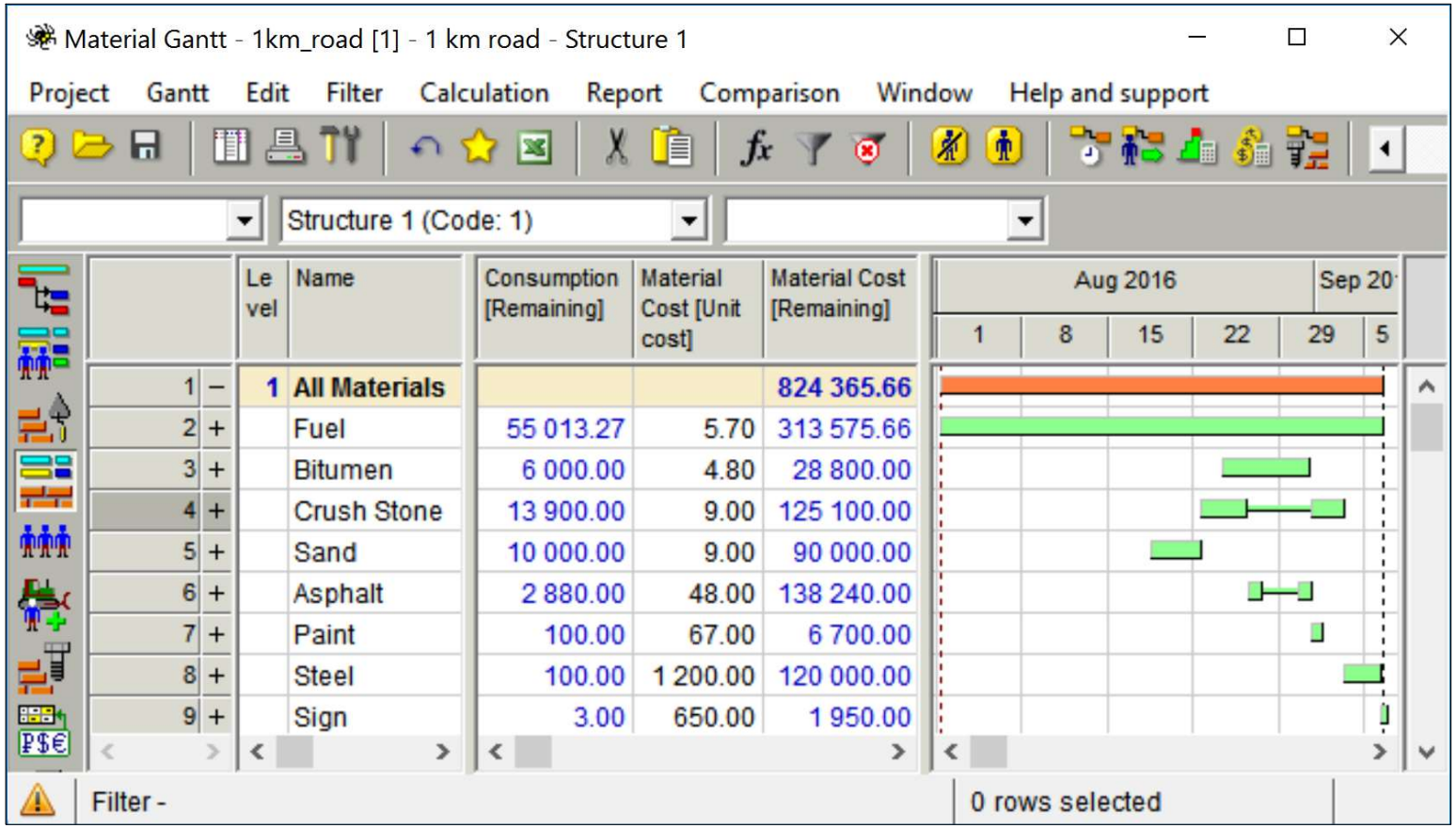


Resource Gantt Chart



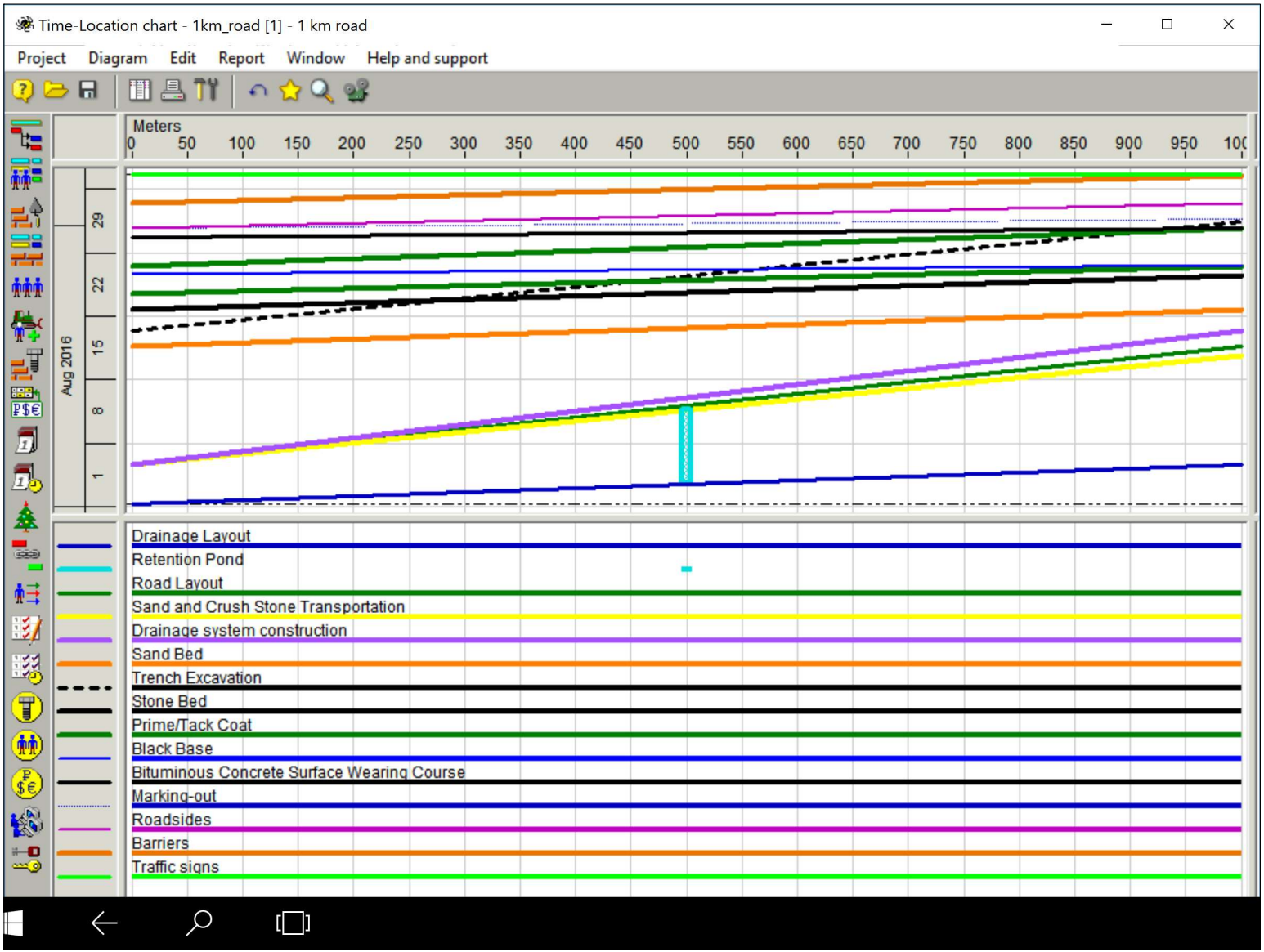
Material Gantt Chart

Material Gantt Chart shows when, on what activities and in what quantities material is planned to be consumed.

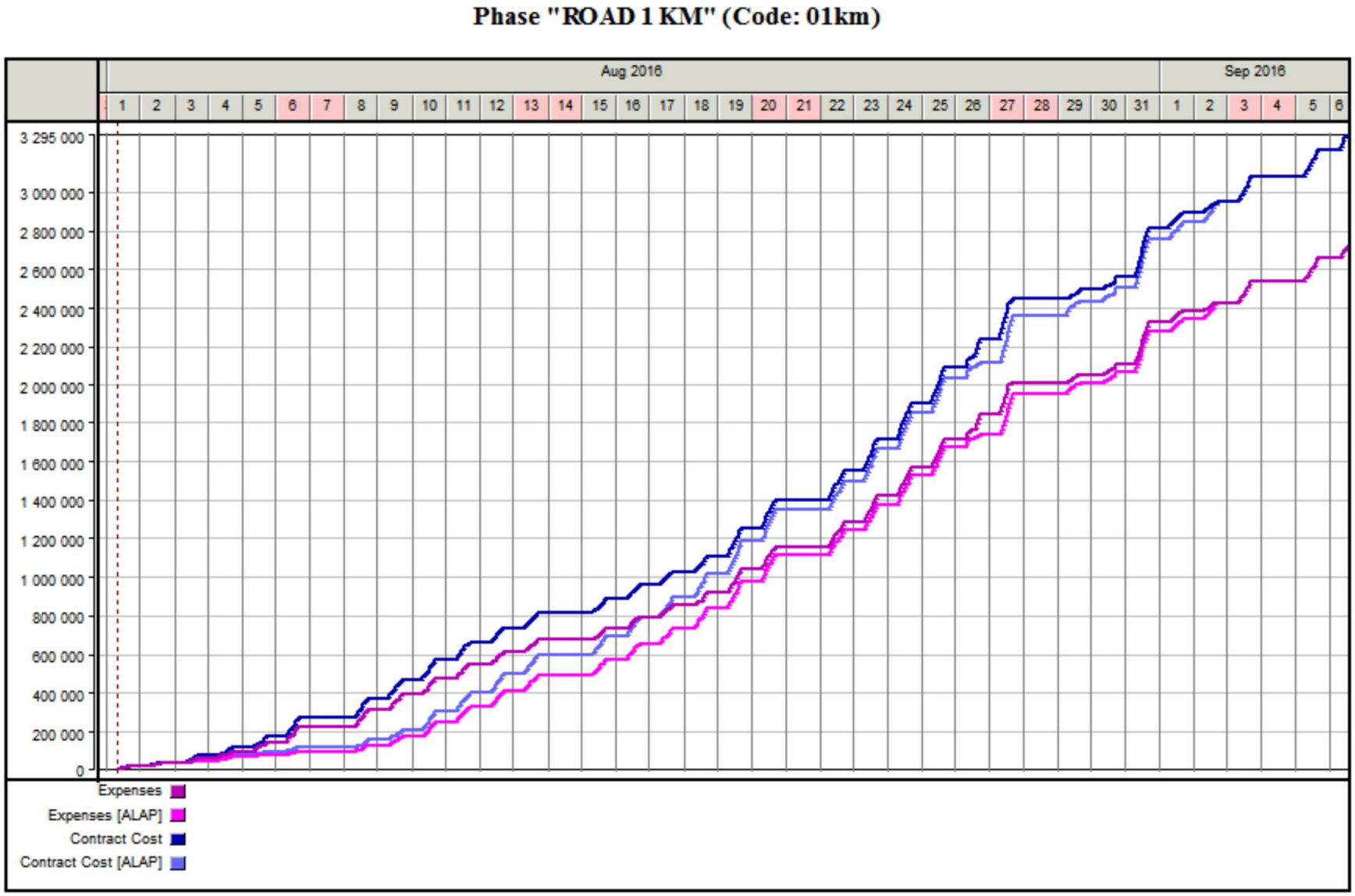


	Level	Name	Consumption [Remaining]	Material Cost [Unit cost]	Material Cost [Remaining]
1	1	All Materials			824 365.66
2		Fuel	55 013.27	5.70	313 575.66
3		Bitumen	6 000.00	4.80	28 800.00
4		Crush Stone	13 900.00	9.00	125 100.00
5		Sand	10 000.00	9.00	90 000.00
6		Asphalt	2 880.00	48.00	138 240.00
7		Paint	100.00	67.00	6 700.00
8		Steel	100.00	1 200.00	120 000.00
9		Sign	3.00	650.00	1 950.00

Time-Location Chart



Reports: S-curves



Reports: Tables

1km_road [1] - Phase "ROAD 1 KM" (Code: 01km)

Document Table Edit Filter Transfer Comparison Window Help and support

	Code	Name	01-08-2016	08-08-2016	15-08-2016	22-08-2016	29-08-2016	05-09-2016
1	01km	ROAD 1 KM						
2	asp	Asphalt paver				1	1	
3	bl1	Bulldoser 1	1	1	1	1	1	
4	bld	Bulldoser	1	1	1	1	1	
5	btd	Bitumen distributor				1	1	
6	drv	Driver	6	6	6	9	9	1
7	ex1	Excavator 1	1	1	1	1	1	
8	exc	Excavator	1	1	1			
9	grd	Grader	2	2	2	2	2	
10	mch	Machinist	8	8	8	9	8	
		Road-roller				2	2	
		Scraper	2	2	2	1	1	
		Special Car					1	1
		Supplier	1	1	1			
		Truck	6	6	6	9	9	
		Vibroroller			2	2	2	
		Worker	8	8	7	7	7	4

0 ro

1km_road [1] - Phase "ROAD 1 KM" (Code: 01km)

Document Table Edit Filter Transfer Comparison Window Help and support

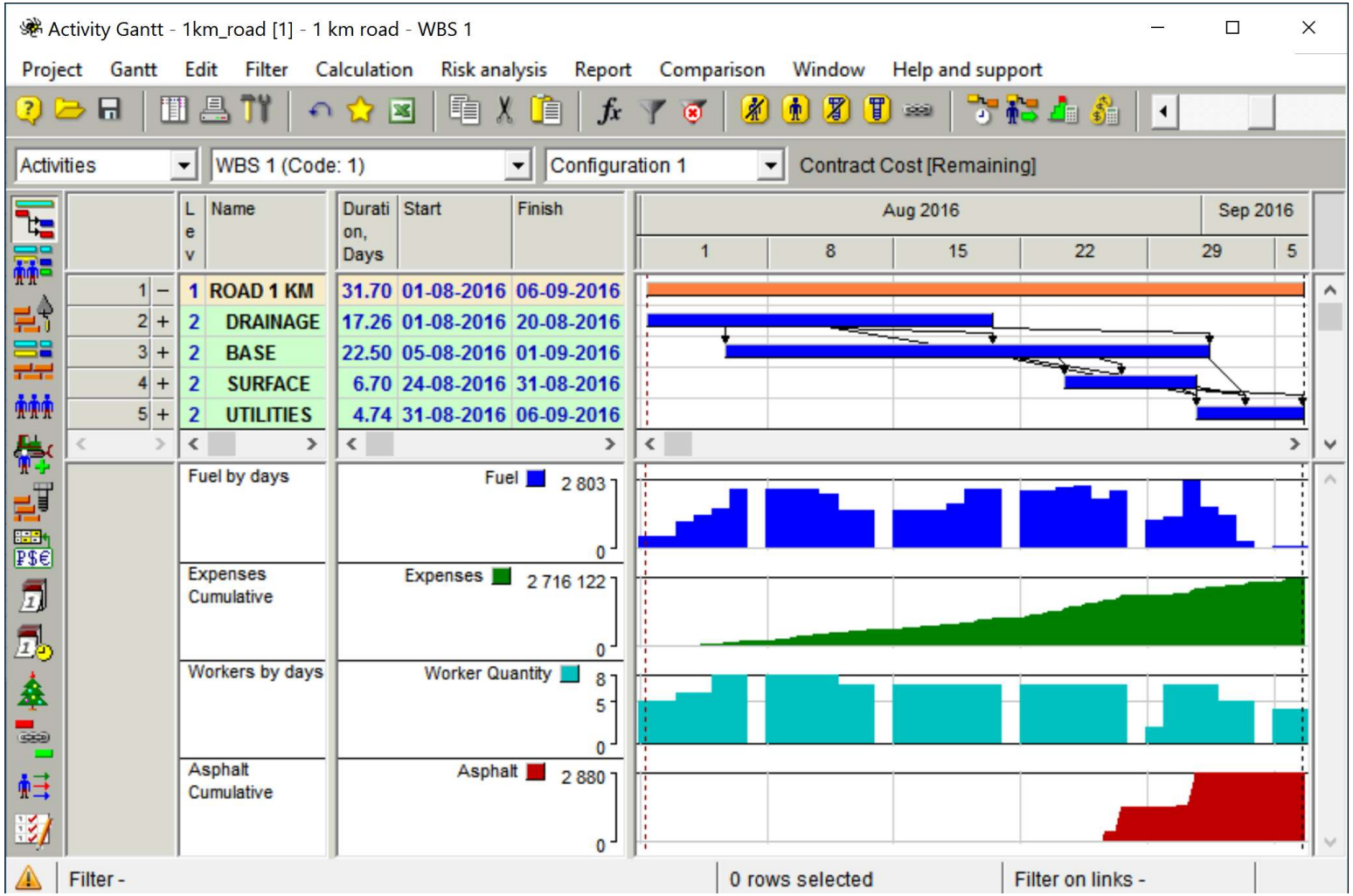
Code

	Name	01-08-2016	08-08-2016	15-08-2016	22-08-2016	29-08-2016	05-09-2016	Total
1	ROAD 1 KM							
2	Contract Cost	270 705.61	541 607.51	592 419.35	1 039 263.72	637 453.31	213 550.51	3 295 000.00
3	Expenses	225 362.16	446 783.80	488 692.31	852 293.72	522 657.35	180 333.10	2 716 122.44
4	DRAINAGE							
5	Contract Cost	215 580.00	274 457.73	159 962.27				650 000.00
6	Expenses	180 316.01	228 481.12	134 038.38				542 835.52
7	BASE							
8	Contract Cost	55 125.61	267 149.77	432 457.08	756 624.28	107 643.25		1 619 000.00
9	Expenses	45 046.15	218 302.68	354 653.92	609 743.80	81 164.71		1 308 911.26
10	SURFACE							
11	Contract Cost				282 639.44	267 360.56		550 000.00
12	Expenses				242 549.92	229 489.63		472 039.55
13	UTILITIES							
14	Contract Cost					262 449.49	213 550.51	476 000.00
15	Expenses					212 003.01	180 333.10	392 336.10

Filter - 0 rows selected

Reports

Multiple Charts on the same screen (Resource Histograms, S-curves, trends, Earned Value, etc.)



Typical Fragments

We created a Typical Fragment, a small project that simulates the execution of a typical part of the company's projects.

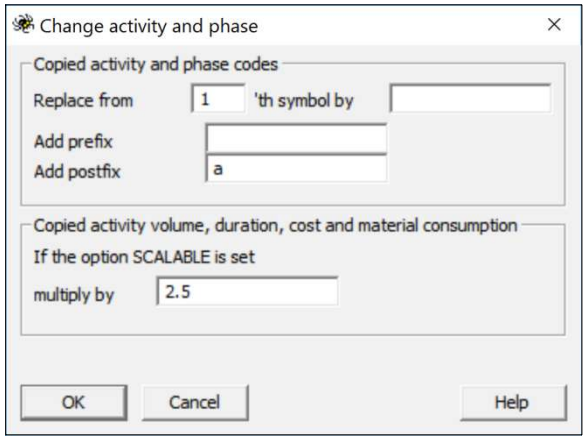
We suggest creating a Typical Fragment Library, a set of typical fragments to use in future projects.

With this library, creating a project model is easy:

- Create project WBS (or use the template),
- Define the volumes of work of the WBS work packages,
- Replace work packages with typical fragments, automatically adjusting activity volumes and durations,
- Link activities of different fragments.

Typical Fragments

When a typical fragment is inserted into the schedule, you will be asked to define what to do with the phase and activity codes in the added fragment (we decide to add a postfix “a”) and what to do with activity volumes and duration (here we multiplied the values by 2.5 because in our project the length of a similar road section is 2.5 km).



In Spider Project, activities have a special property, scalability. It defines whether or not activity volumes and duration should be multiplied when the fragment is inserted.

Reference books

Creating this fragment, we entered a lot of data that can be used in future projects:

Project Resources, Materials, Cost Components, Cost Centers, Calendars, Resource Skills, Resource Crews for different types of work (Multi-resources), Resource Assignment Productivity, Material Consumption per Volume Unit for different types of work, Unit Costs, Resource Workloads on typical assignments, etc.

It is reasonable to store this data in the corporate databases (reference books) and use when necessary rather than enter these data again and again.

Examples of Reference Books

Activity_cost_and_material_requirements__per_volume_unit_ [1] - Activity cost and material re...

Document Table Edit Filter Transfer Comparison Window Help and support

	Type	Type name	Unit of volu	Bitumen [Per	Crush Ston	Sand [Per	Asphalt [Per	Paint [Per volu	Steel [Per volu	Sign [Per volu	Contract Cost
1	blb	Black Base	m2				0.12				
2	brr	Barriers	m						0.05		
3	cot	Prime Coat	m2	0.25							
4	mrk	Marking-out	m					0.10			
5	rds	Roadsides	m2		0.15						
6	snb	Sand Bed	m3			1.00					
7	srf	Bituminous Concrete Surface Wearing Course	m2				0.12				
8	stb	Stone Bed	m3		1.30						
9	str	Sand and Crush Stone Transportation	m3								10.00
10	trs	Traffic signs	pc							1.00	

Filter -

Resource_assignment_productivities [1] - Resource assignment producti...

Document Table Edit Filter Transfer Comparison Window Help

	Type	Type name	Productivity	Unit of volu
1	blb_ap	Black Base Asphalt paver	1 150.00	m2
2	brr_wr	Barriers Worker	22.00	m
3	cot_bd	Tack Coat Bitumen distributor	370.00	m2
4	drc_e0	Drainage system construction Excavator	32.00	m
5	drc_e1	Drainage system construction Excavator 1	27.00	m
6	drl_sc	Drainage Layout Scraper	105.00	m2
7	mrk_sc	Marking-out Special Car	110.00	m
8	pnd_e0	Retention Pond Excavator	32.00	m3
9	pnd_e1	Retention Pond Excavator 1	27.00	m3
10	rds_gr	Roadsides Grader	270.00	m2
11	rlt_sc	Road Layout Scraper	110.00	m2
12	snb_b0	Sand Bed Bulldoser	165.00	m3
13	snb_b1	Sand Bed Bulldoser 1	140.00	m3
14	srf_ap	Bituminous Concrete Surface Wearing Course Asphalt paver	1 150.00	m2
15	stb_b0	Stone Bed Bulldoser	165.00	m3
16	stb_b1	Stone Bed Bulldoser 1	140.00	m3
17	trn_e0	Trench Excavation Excavator	22.00	m
18	trn_e1	Trench Excavation Excavator 1	20.00	m
19	trs_wr	Traffic signs Worker	0.60	pc

Filter - 0 rows selected

Resources [1] - Resources

Document Table Edit Filter Transfer Comparison Window Help and support

	Code	Name	Quantity	Fuel [Per hour	Labour Cost	Machine Cost	Indirect Cost	Calendar	Notify before start
1	grd	Grader	2	15		50.0	59.0	1	No
2	bld	Bulldoser	1	20		50.0	59.0	1	No
3	bl1	Bulldoser 1	1	18		45.0	53.1	1	No
4	scr	Scraper	2	20		70.0	82.6	1	No
5	exc	Excavator	1	25		60.0	70.8	1	No
6	ex1	Excavator 1	1	22		50.0	59.0	1	No
7	mch	Machinist	9		40.0		47.2	1	No
8	wrk	Worker	8		30.0		35.4	1	No
9	trc	Truck	9	15		35.0	41.3	1	No
10	drv	Driver	9		35.0		41.3	1	No
11	spl	Supplier	1					1	No
12	vbr	Vibroroller	2	20		60.0	70.8	1	No
13	btd	Bitumen distributor	1	15		35.0	41.3	1	No
14	asp	Asphalt paver	1	20		80.0	94.4	1	No
15	rrl	Road-roller	2	20		50.0	59.0	1	No
16	spc	Special Car	1	10		40.0	47.2	1	No

Filter -

Reference Books

With reference books, it is sufficient to enter activity, resource or assignment type and work volume and come up with activity cost, resource, and material requirements, resource assignments productivity, activity duration and calendars, etc.

With the comprehensive corporate reference books, it is hard to make an error and everyone may be assured that their scheduling and cost data are consistent with the corporate norms and standards.

If anything changes, it is sufficient to make changes in the reference books and apply these changes to all future works on all projects based on these reference books.

Risk Simulation

We created the deterministic (most likely) project model for building 1 km of the road but in real life all project estimates are not certain.

Resource productivity can be higher or lower, material costs can be higher or lower, risk events may happen or not, etc.

Spider Project simulates uncertainties and risks and helps to determine reliable project targets and create sufficient contingency reserves.

Spider Project includes two methods of risk simulation, each with its own advantages and weaknesses:

The Monte Carlo risk simulation and Three Scenarios method

Risk Simulation

To simulate initial data uncertainty, it is necessary to collect and enter three estimates (optimistic, most likely, and pessimistic) of the data used for project scheduling and budgeting.

Resource assignments - 1km_road [1] - 1 km road

Project Table Edit Filter Window Help and support

Start

	Activity code	Resource code	Activity name	Resource name	Productivity	Opt - Productivity	Exp - Productivity	Pes - Productivity
70	trs	wrk	Traffic signs	Worker	0.60	0.70	0.60	0.40
71	trn	ex1	Trench Excavation	Excavator 1	20.00	22.00	20.00	15.00
72	brr	wrk	Barriers	Worker	22.00	25.00	22.00	18.00
73	trn	exc	Trench Excavation	Excavator	22.00	22.00	22.00	17.00
74	drc	ex1	Drainage system construction	Excavator 1	27.00	27.00	27.00	24.00
75	pnd	ex1	Retention Pond	Excavator 1	27.00	30.00	27.00	22.00
76	drc	exc	Drainage system construction	Excavator	32.00	35.00	32.00	25.00
77	pnd	exc	Retention Pond	Excavator	32.00	32.00	32.00	24.00
78	drl	scr	Drainage Layout	Scraper	105.00	120.00	105.00	80.00
79	mrk	spc	Marking-out	Special Car	110.00	125.00	110.00	80.00
80	rlt	scr	Road Layout	Scraper	110.00	130.00	110.00	80.00
81	stb	bl1	Stone Bed	Bulldoser 1	140.00	150.00	140.00	120.00
82	snb	bl1	Sand Bed	Bulldoser 1	140.00	160.00	140.00	110.00
83	stb	bld	Stone Bed	Bulldoser	165.00	180.00	165.00	130.00
84	snb	bld	Sand Bed	Bulldoser	165.00	190.00	165.00	120.00
85	rds	grd	Roadsides	Grader	270.00	300.00	270.00	220.00
86	ct2	btd	Tack Coat	Bitumen distributor	370.00	400.00	370.00	320.00
87	ct1	btd	Prime Coat	Bitumen distributor	370.00	400.00	370.00	320.00
88	blb	asp	Black Base	Asphalt paver	1 150.00	1 250.00	1 150.00	1 000.00
89	srf	asp	Bituminous Concrete Surface Wearing Course	Asphalt paver	1 150.00	1 250.00	1 150.00	1 000.00

Filter - 0 rows selected

Risk Simulation

Risk events are simulated as trigger activities in the project schedule, each having a probability of happening.

When a risk (trigger) occurs, further project activities, resources, calendars, costs, etc. may change.

A trigger activity may be followed by branching, each branch with its own probability.

Each branch represents potential development of a risk event and appropriate risk response.

Besides, additional corrective actions may be simulated by conditional branches using switch activities. Example: if the project is more than one month late, we will use additional resources.

MC Risk Simulation

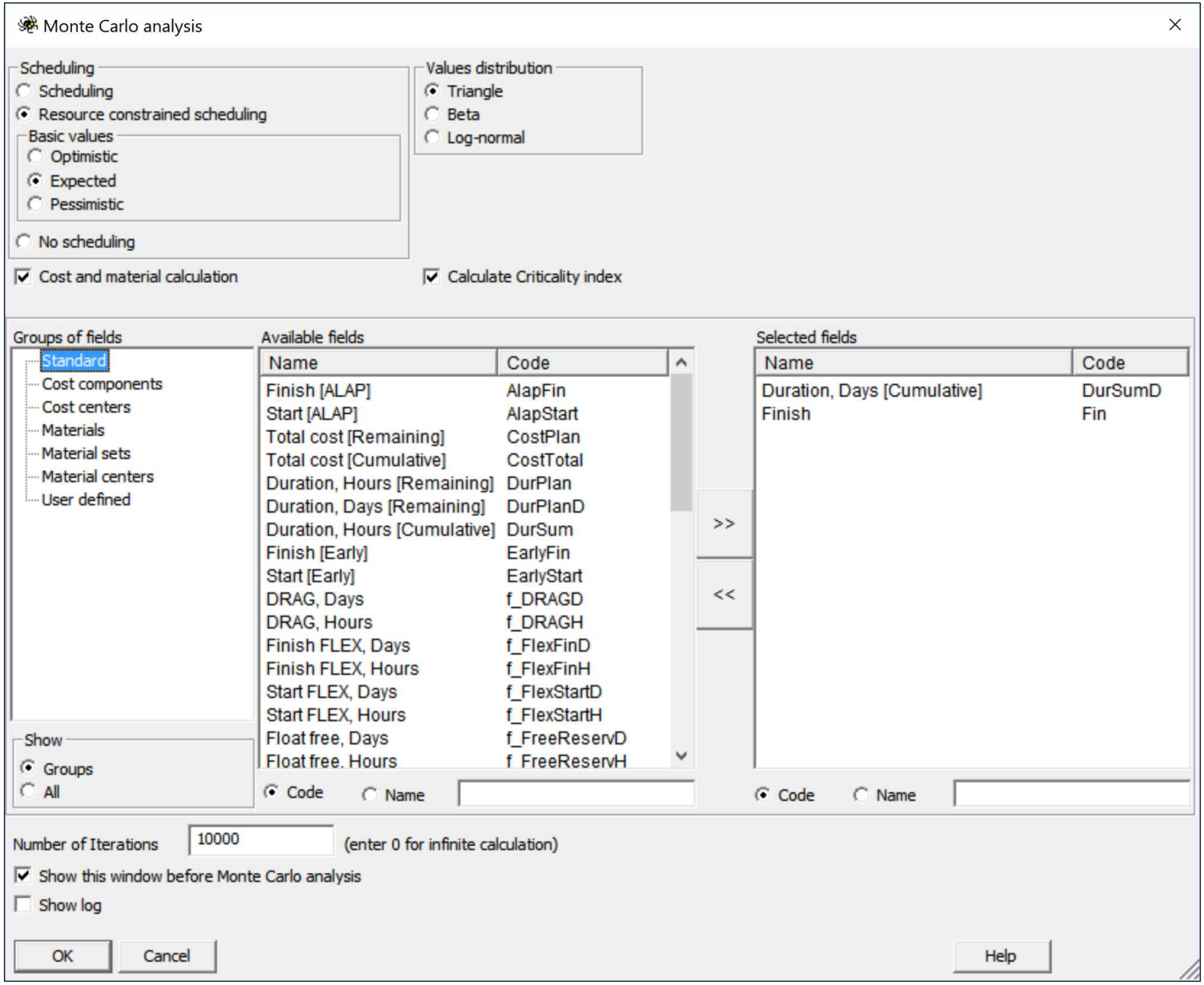
This probabilistic model is used for the Monte Carlo simulation.

In our project, we enter the data uncertainty but do not simulate risk events (this is Spider Intro and our project is just a fragment of a real project).

In the Monte Carlo risk analysis dialog, we can select which probability distributions to calculate, which initial data distributions to use, the number of iterations, etc.

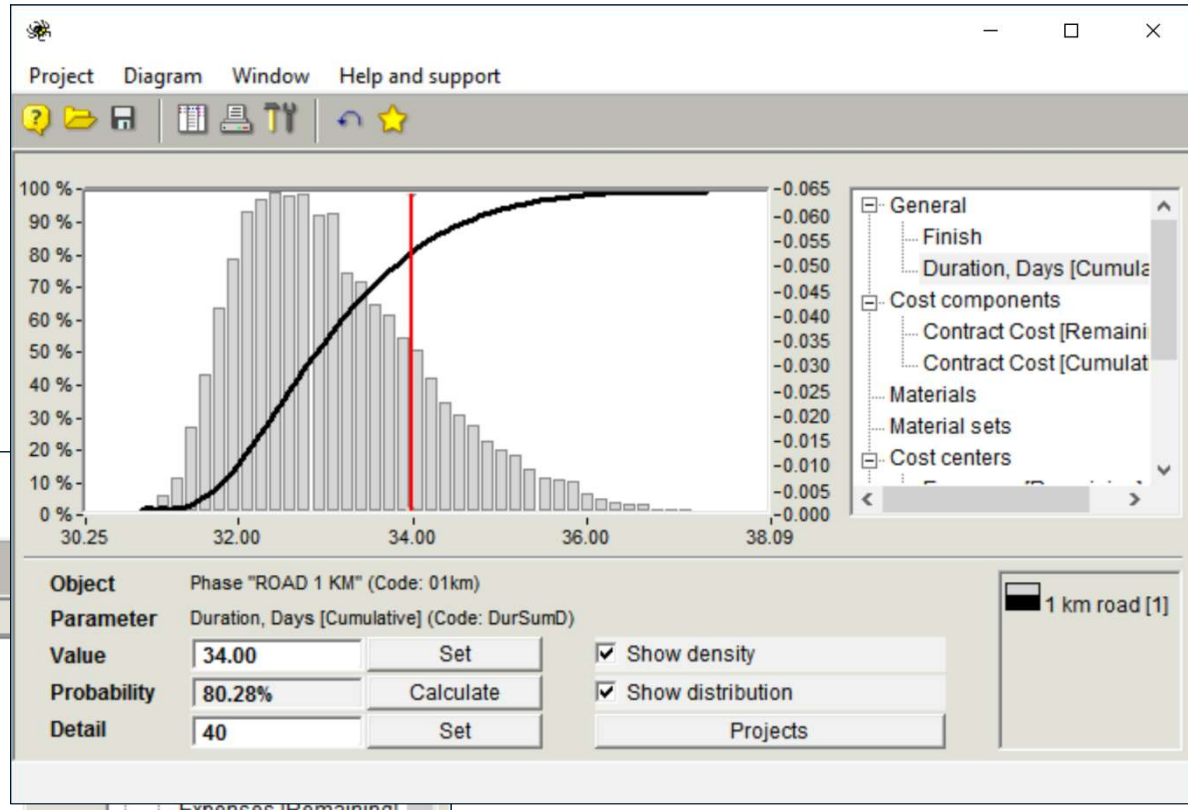
In Spider Project, the Monte Carlo simulation takes into account all time, resource, material, and cost constraints, which makes Monte Carlo Risk Analysis in Spider Project outstanding.

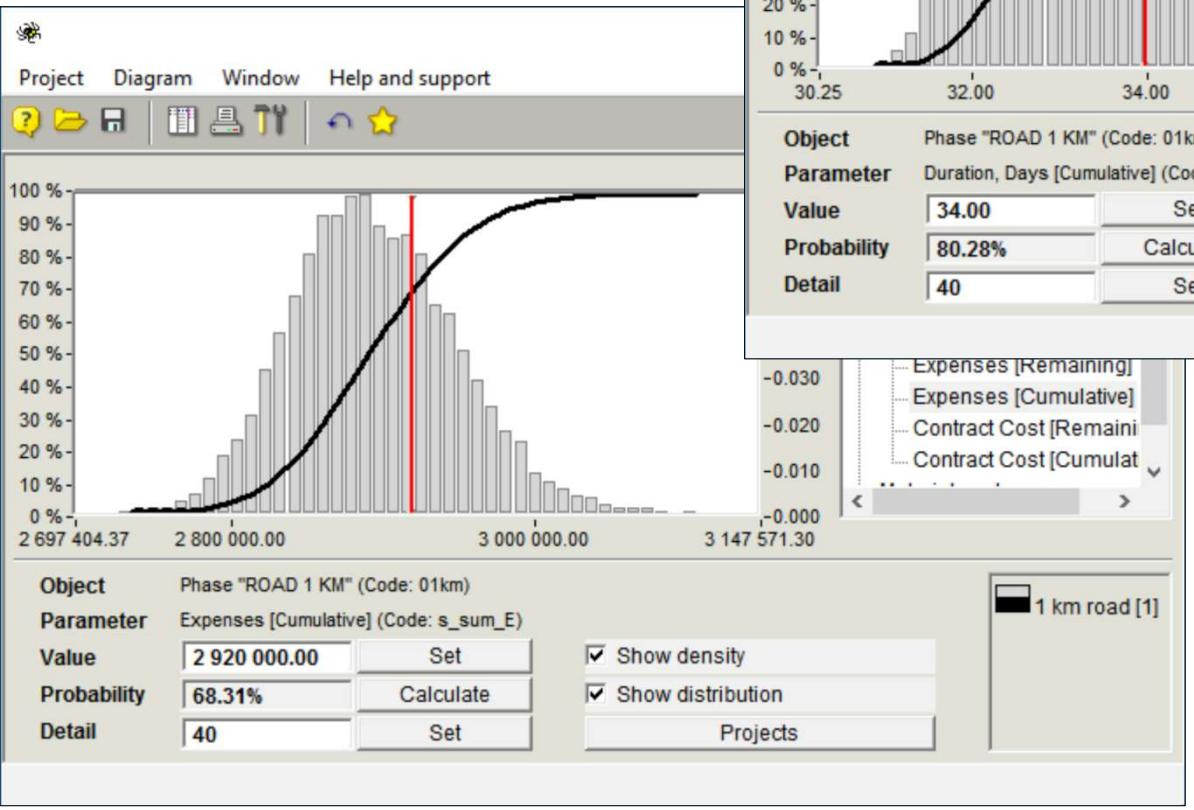
MC Risk Simulation



MC Risk Simulation: Probability Curves

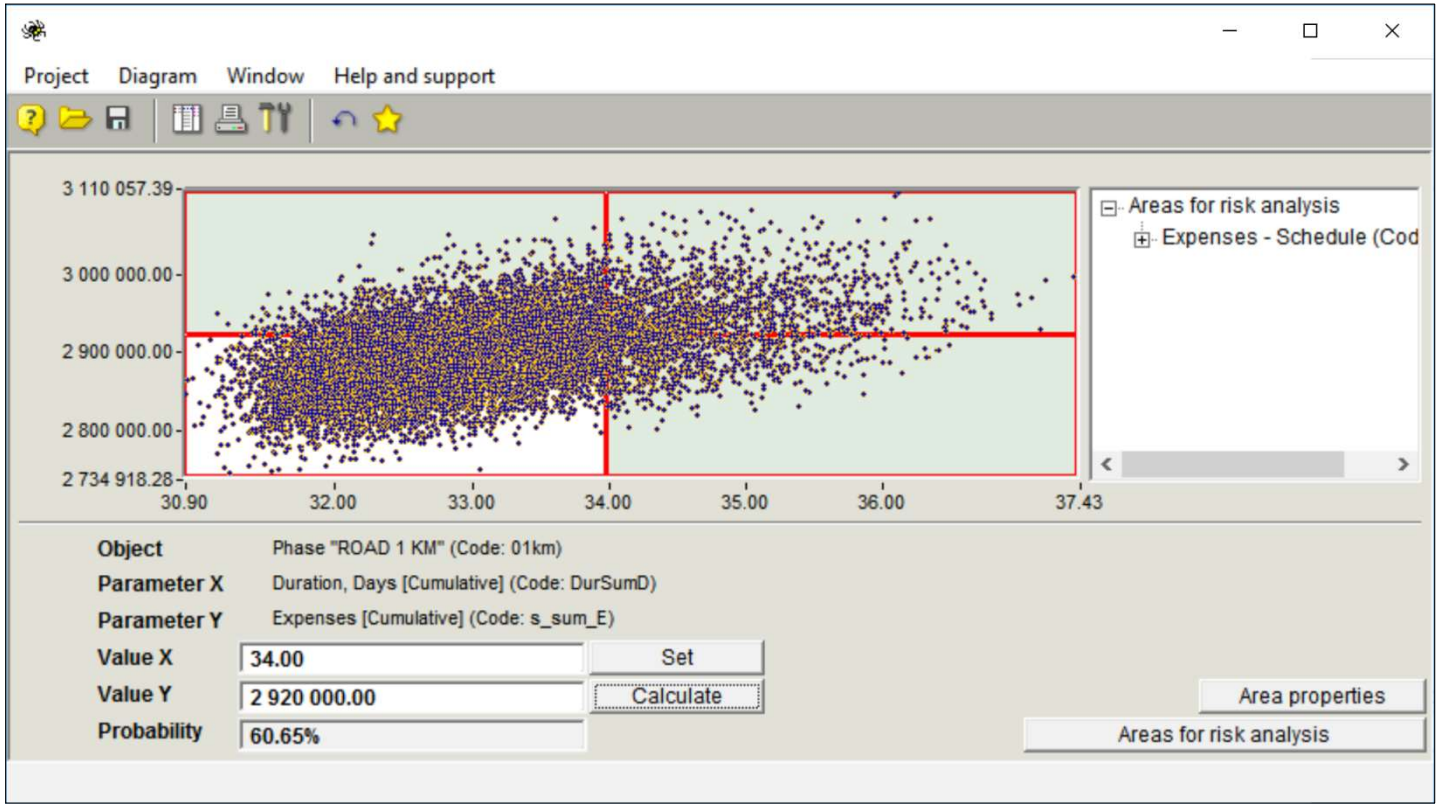
Examples of MC probability curves





MC Risk Simulation: Scatter Diagram

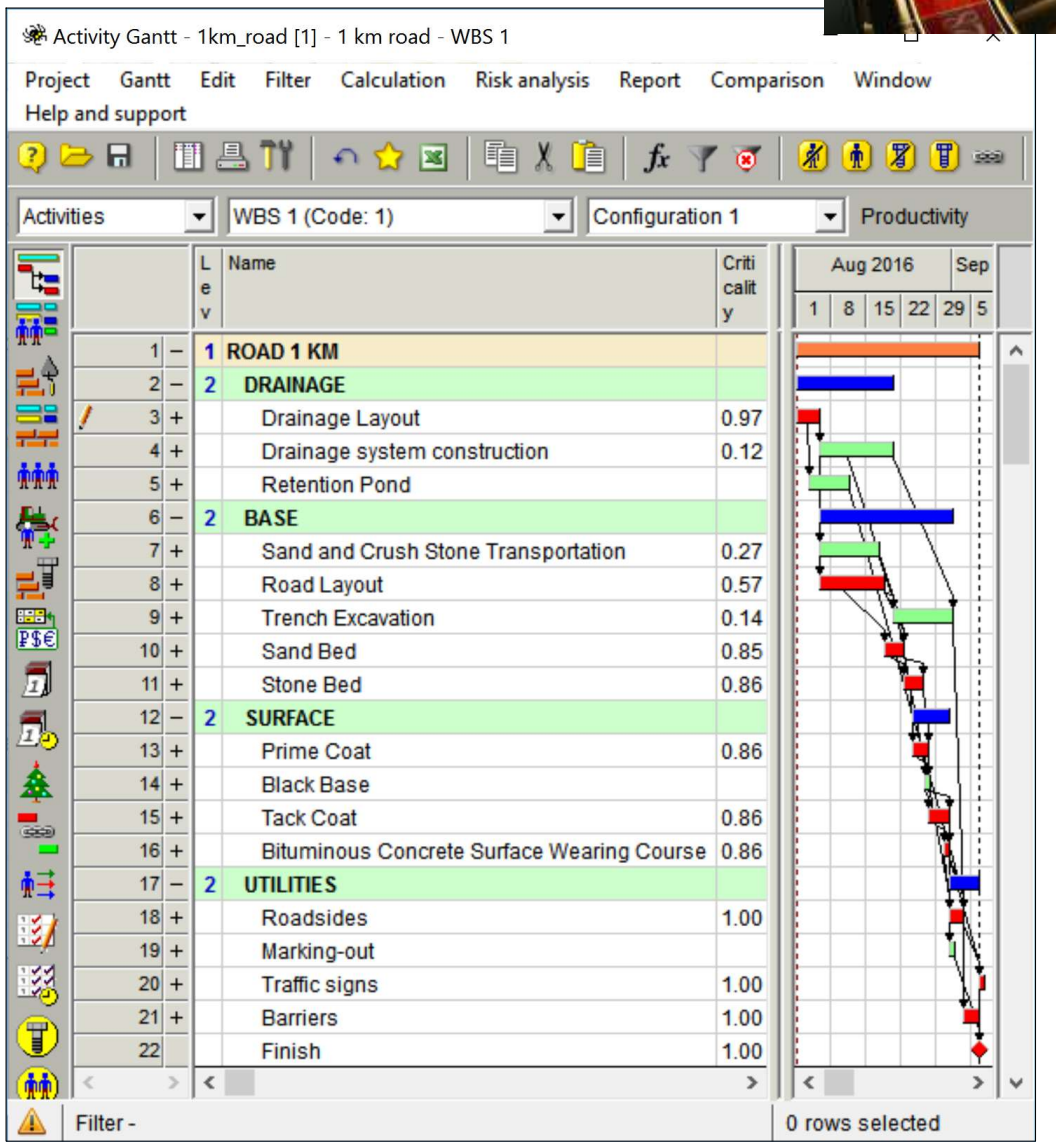
The probability of finishing our project in less than 34 days exceeds 80%, spending less than 2,920,000 exceeds 68.5%. However, the probability of meeting both targets is only 60.65%.



MC Risk Simulation: Criticality Index

Criticality Index shows the probability of an activity becoming critical.

In some schedules, non-critical activities have a high criticality index and thus require serious attention.



3 Scenarios Risk Simulation

Using the three scenario method we create not one but three project models: the optimistic, the most likely, and the pessimistic.

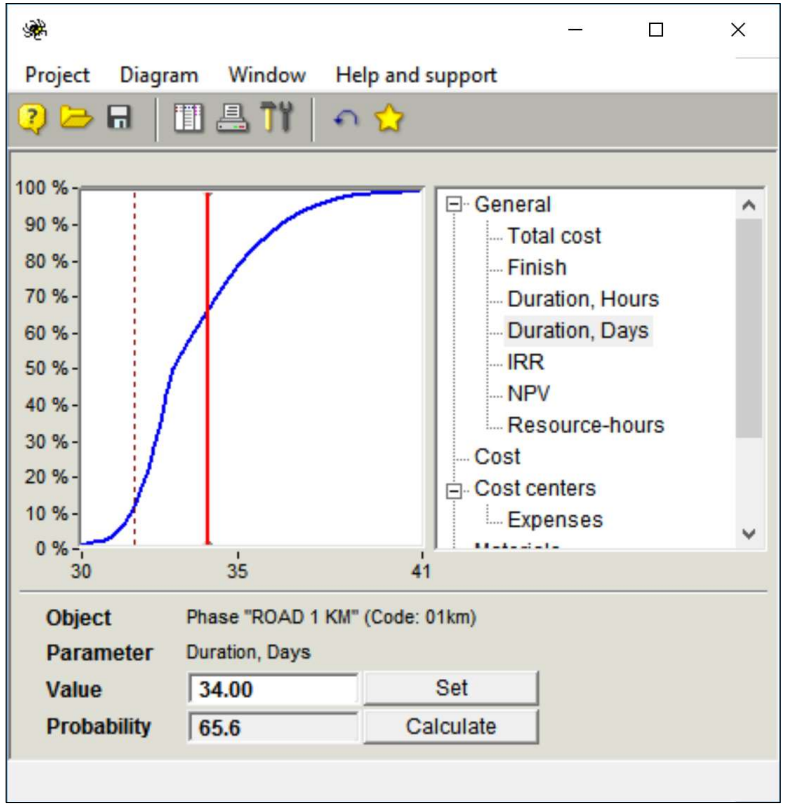
Based on these models, Spider Project creates probability distributions and calculates project buffers necessary for achieving project goals with user-defined probabilities.

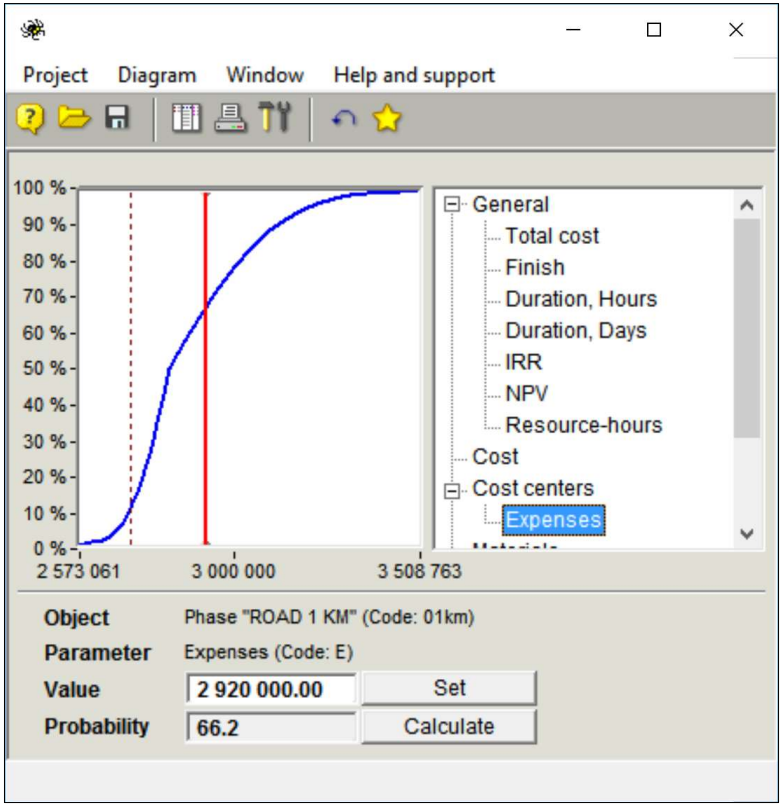
Targets may be set, based on the required probabilities of achieving.

However, target dates and costs can be also set from the start. In this case, Spider Project will calculate the probabilities of meeting these targets.

3 Scenarios Risk Simulation

3 scenarios probability curves are intentionally wider for the reasons that will be discussed in the Spider Project Risk Analysis presentation.





3 Scenarios Risk Simulation

We recommend using the optimistic project scenario for managing project workforce and estimating buffer consumption by analyzing the success probability trends.

When the probabilities of meeting project targets (success probabilities) show negative trends, the corrective actions should be considered.

When the actual data are entered in any of these 3 versions, all 3 are updated and synchronized.

Some Spider Project users use this feature to manage 3 schedules in parallel:

- Optimistic: for workforce management,
- Most Likely: for project management team,
- Pessimistic: as contract schedule

Schedule Analysis Tools

Spider Project includes many tools for schedule analysis:

- Critical Schedule
- Start and Finish Buffers
- Different types of activity and assignment floats (total float, free float, start and finish flexes, super float)
- Resource Critical Path
- Activity DRAGs

Schedule Analysis Filters

Predefined Spider Project filters include:

- activities without successors
- activities without predecessors
- all activities preceding the selected activity
- all activities succeeding the selected activity
- activities that use certain resources and skills
- any filter for project dependencies

Any other filters are also available together with the formulas that link fields and cells, including the recursive formulas.

Schedule Analysis

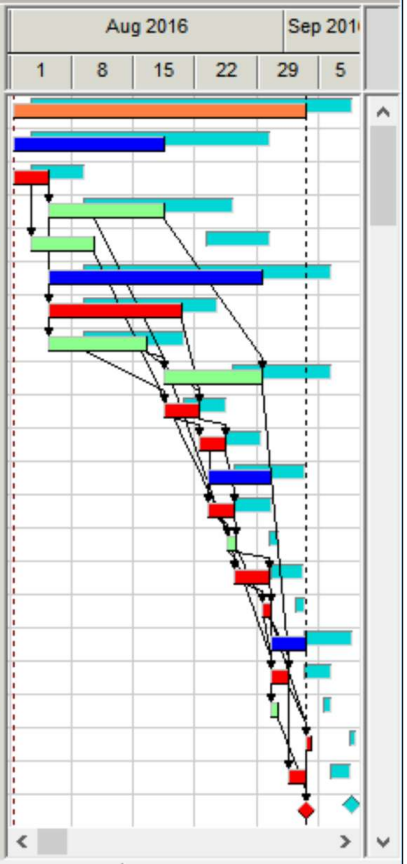
Critical Schedule, DRAGs, Floats

Activity Gantt - 1km_road_opt [1] - ROAD 1 KM - WBS 1

Project Gantt Edit Filter Calculation Risk analysis Report Comparison Window Help and support

Activities | WBS 1 (Code: 1) | Configuration 1 | Productivity

	Lev	Name	Duration, Days	Start [Buffer]	Finish [Buffer]	Float total, Day	Float free, Day	DRAG, Days	Start FLEX, Days	Finish FLEX, Days
1	1	ROAD 1 KM	29.99	2.29	4.01					
2	2	DRAINAGE	15.60	2.29	9.79					
3		Drainage Layout	4.17	2.29	2.88			4.17		
4		Drainage system construction	11.43	3.18	6.57	2.88				
5		Retention Pond	6.67	17.05	16.64	6.76	6.76			19.02
6	2	BASE	20.52	2.88	6.57					
7		Sand and Crush Stone Transportation	13.20	2.88	2.88			2.88		
8		Road Layout	9.23	2.89	4.57	2.11	2.11			2.11
9		Trench Excavation	9.09	6.57	6.57	2.88	1.08			1.08
10		Sand Bed	2.86	2.46	2.88				2.11	
11		Stone Bed	3.03	2.88	3.13			1.21		
12	2	SURFACE	6.19	2.98	3.48					
13		Prime Coat	3.00	2.98	3.22			2.62		
14		Black Base	0.96	3.57	3.66	0.38				
15		Tack Coat	3.00	3.22	3.47			2.23		
16		Bituminous Concrete Surface Wearing Course	0.96	3.40	3.48			0.96		
17	2	UTILITIES	4.21	3.48	4.01					
18		Roadsides	2.00	3.48	3.71			1.60		
19		Marking-out	0.80	4.80	4.91	1.20	1.20			3.41
20		Traffic signs	0.21	3.98	4.01			0.21		
21		Barriers	2.00	3.71	3.98			2.00		
22		Finish		4.01	4.01					



Filter - | 0 rows selected | Filter on links -

Other Features

In this introductory presentation, we have covered only a small part of Spider Project planning options and features.

If we had more time, we could discuss:

- Multiple Work, Resource and Material Breakdown Structures,
- Part Time Resource Assignments
- Variable Resource Assignments
- Modeling work in several shifts
- Variable Material Cost
- Cost and Material Leveling
- Cost Discounting
- Investment Analysis (NPV, IRR, Payback Period)

And a lot more.

What was unique in what we've done?

We created a project model based on the volumes (amounts) of work to be done, and assigned resource productivity

We used volume lags

We created the resource skills and Spider Project selected which resources to use on the schedule activities

We created and assigned the resource crews

We created the cost components and cost centers

We assigned costs as unit costs and assignment costs

We defined and assigned material consumption per work volume unit

We created two parallel budgets for the same project

What was unique in what we've done?

We have optimized project resource-constrained schedule

We created a project fragment that may be used in future projects

We created the corporate reference books, which enables us to apply the corporate norms and standards to future projects

We created different project plan reports including Resource and Material Gantt Charts and Time-Location Chart

We simulated risks, taking into account all project constraints, and created project time and cost buffers.

There are many other useful and unique Spider Project features that will be discussed in other presentations.

Thank you!

Spider
Project Team

For future contacts:

E-mail: v.liberzon@gmail.com

Web: www.spiderproject.com