Spider Project

INTRODUCTION

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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 is used in 36 countries and is most popular in Russia where it is used for management of most large scale programs like management of all construction for 2014 Winter Olympic Games and construction of all stadiums used for 2018 FIFA World Cup.

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.

Unique features of Spider Project

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 (Critical Chain) Calculation
- Resource-constrained Schedule Optimization
- Cash and Material Flow Calculation and Management
- Unlimited number of cost components and parallel budgets
- Multiple currencies
- Management of project archives and Trend Analysis
- Quantitative Risk Analysis that takes into account all existing constraints
- Estimating and management of project time and cost buffers
- Multiple WBS, RBS, MBS and a lot more

Spider Project Introduction

This presentation is an Intro to Spider Project.

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

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

As the sample project we will plan the construction of 1km of the small road.

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 Microsoft Windows.

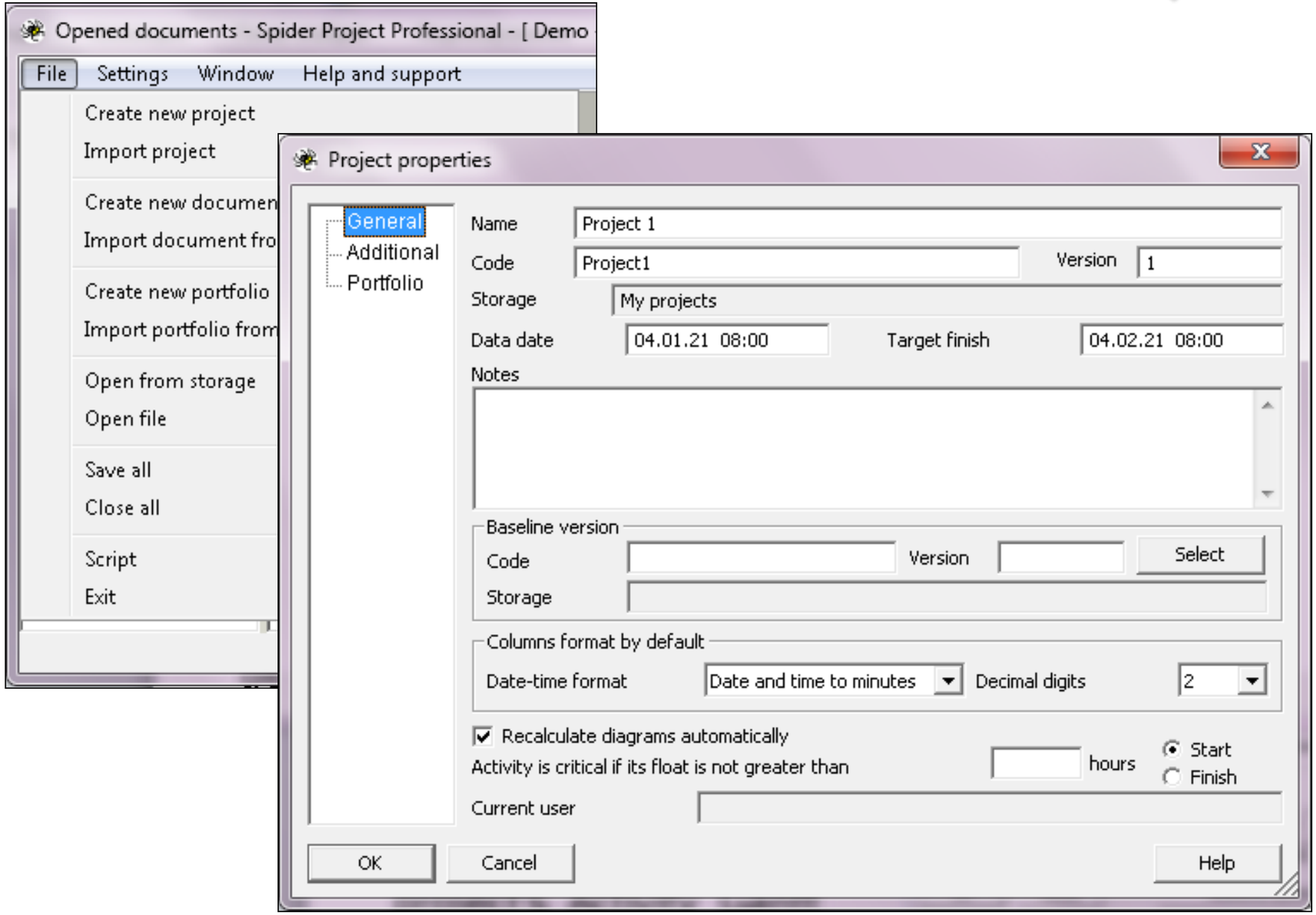
In five minutes you will be ready to manage projects and portfolios of any size and complexity.

Step 1. Create Project

In the File menu of the main screen select "Create 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 or edited later.

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



Step 1.

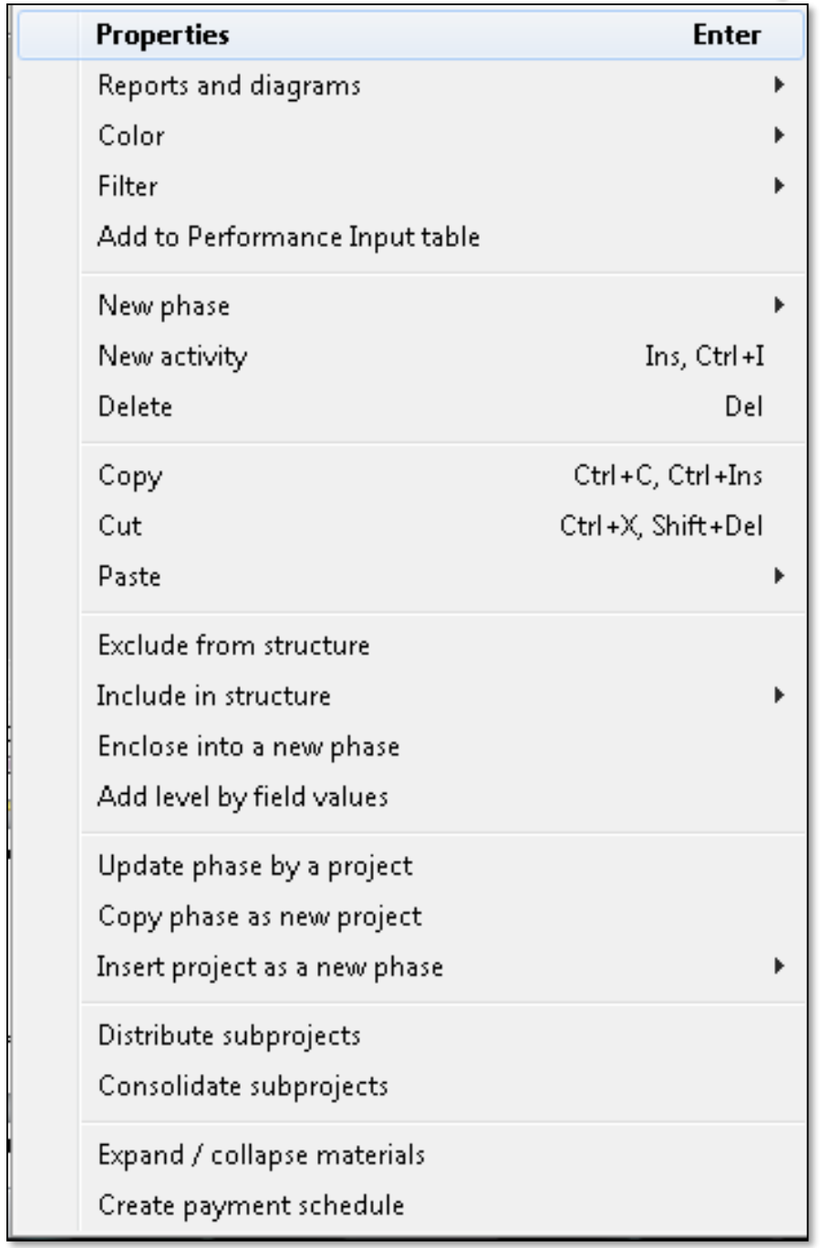
A key to working with Spider Project is right mouse click:

Any object properties and menus will appear after right mouse clicking on the object row number or on its 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.



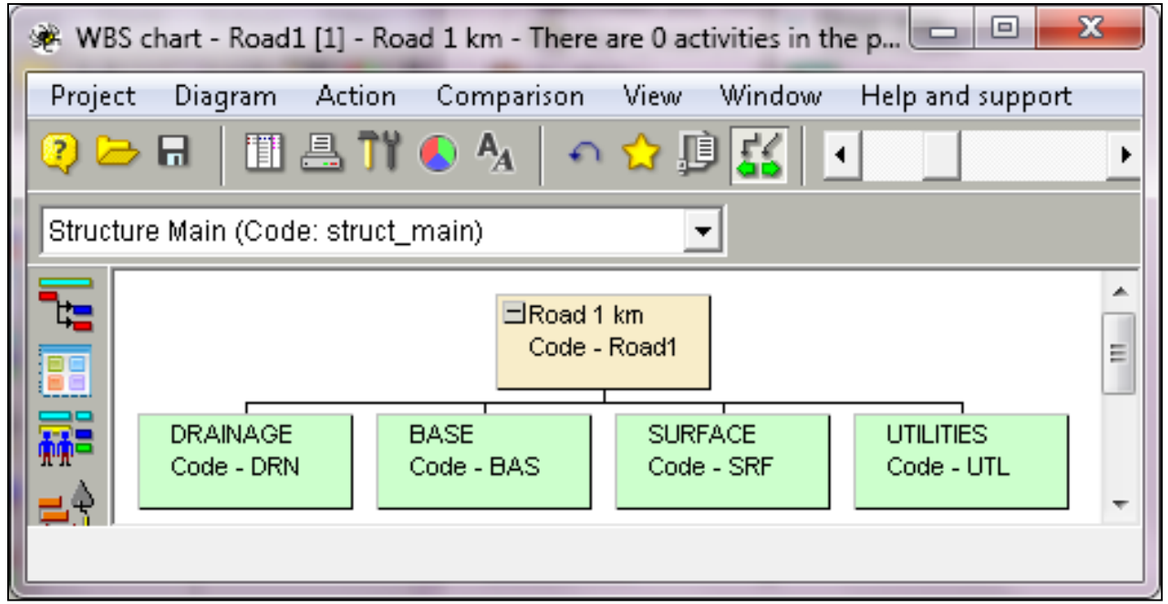
Step 2. Create main WBS

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

Our project is the construction of 1 km road and 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 and selecting corresponding item or just 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 crew from its start to the 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.
5. Assigned resources should have the same productivity on each part of the activity.
6. Material requirements per volume unit should be the same on each part of the activity.

Step 3. Create project activities

There are following types of activities in Spider Project:

- Duration (initial information is activity duration that does not depend on assigned resources)
- Productivity (initial information is activity volume of work and duration is calculated after total productivity of assigned resources is known)
- Hammock (activity lasts from one event to another)
- Milestone (zero duration activity which represents an event)
- Switch (zero duration activity that has two positions, Yes and No. Positions can depend on user-defined conditions. If Yes, one branch of the network is selected, if No, then another. We call this conditional scheduling)
- Trigger 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

Other properties of project activities can include:

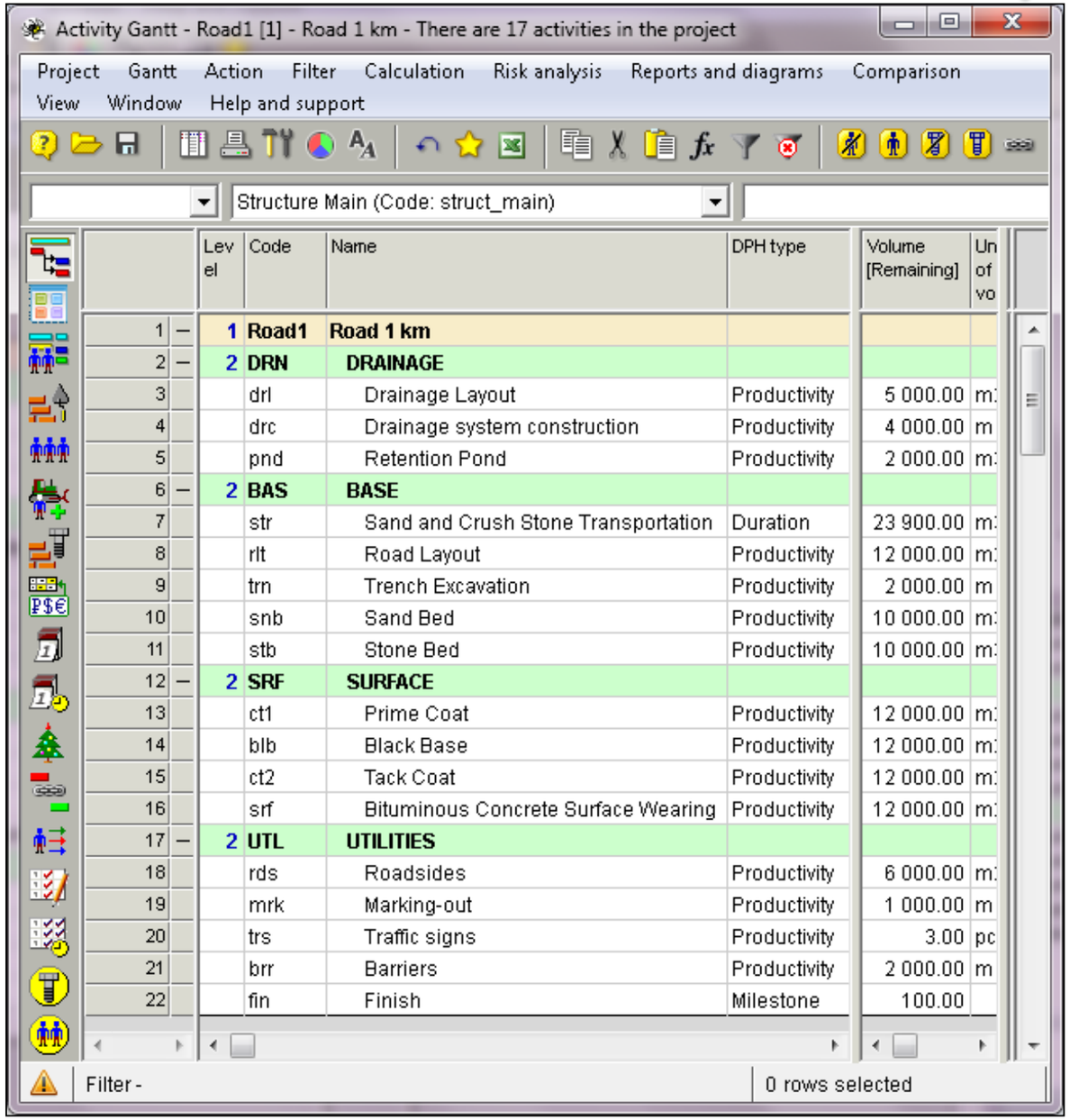
- Activity priority
- Constraints: Start No Earlier Than or Finish No Later Than
- If activity must be performed ASAP or ALAP,
- If activity execution can be interrupted and for how long
- If activity is continuous (if cannot be finished before the end of work day then must start next day)
- If activity duration is adjustable (can be increased to minimize project duration)

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 and types.



	Level	Code	Name	DPH type	Volume [Remaining]	Unit of vo
1	1	Road1	Road 1 km			
2	2	DRN	DRAINAGE			
3		drl	Drainage Layout	Productivity	5 000.00	m
4		drc	Drainage system construction	Productivity	4 000.00	m
5		pnd	Retention Pond	Productivity	2 000.00	m
6	2	BAS	BASE			
7		str	Sand and Crush Stone Transportation	Duration	23 900.00	m
8		rlt	Road Layout	Productivity	12 000.00	m
9		trn	Trench Excavation	Productivity	2 000.00	m
10		snb	Sand Bed	Productivity	10 000.00	m
11		stb	Stone Bed	Productivity	10 000.00	m
12	2	SRF	SURFACE			
13		ct1	Prime Coat	Productivity	12 000.00	m
14		blb	Black Base	Productivity	12 000.00	m
15		ct2	Tack Coat	Productivity	12 000.00	m
16		srf	Bituminous Concrete Surface Wearing	Productivity	12 000.00	m
17	2	UTL	UTILITIES			
18		rds	Roadsides	Productivity	6 000.00	m
19		mrk	Marking-out	Productivity	1 000.00	m
20		trs	Traffic signs	Productivity	3.00	pc
21		brr	Barriers	Productivity	2 000.00	m
22		fin	Finish	Milestone	100.00	

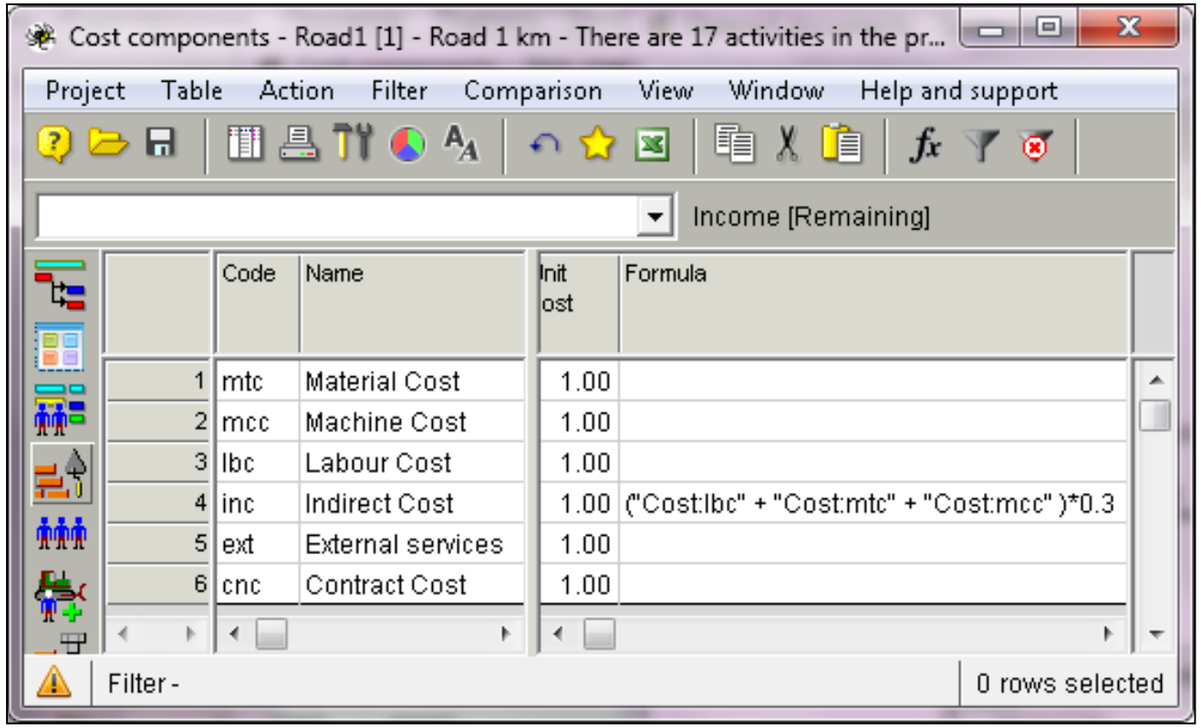
Step 4. Define cost structure

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

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

Cost components can 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	Include material consumption	Include material income
1	E	Expenses	Yes	Yes
2	C	Contract Cost	Yes	Yes

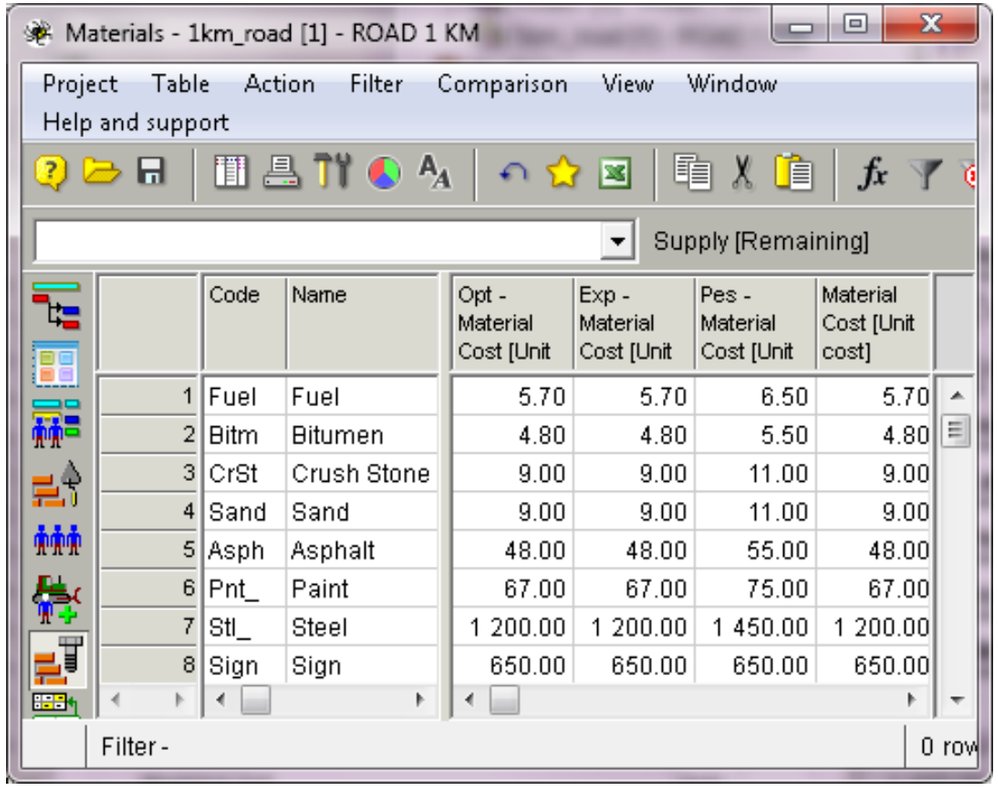


Step 5. Define project materials

Some of these will be assigned to project activities, others (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.

We entered the ranges of expected material costs for future Monte Carlo simulation of expected project cost.



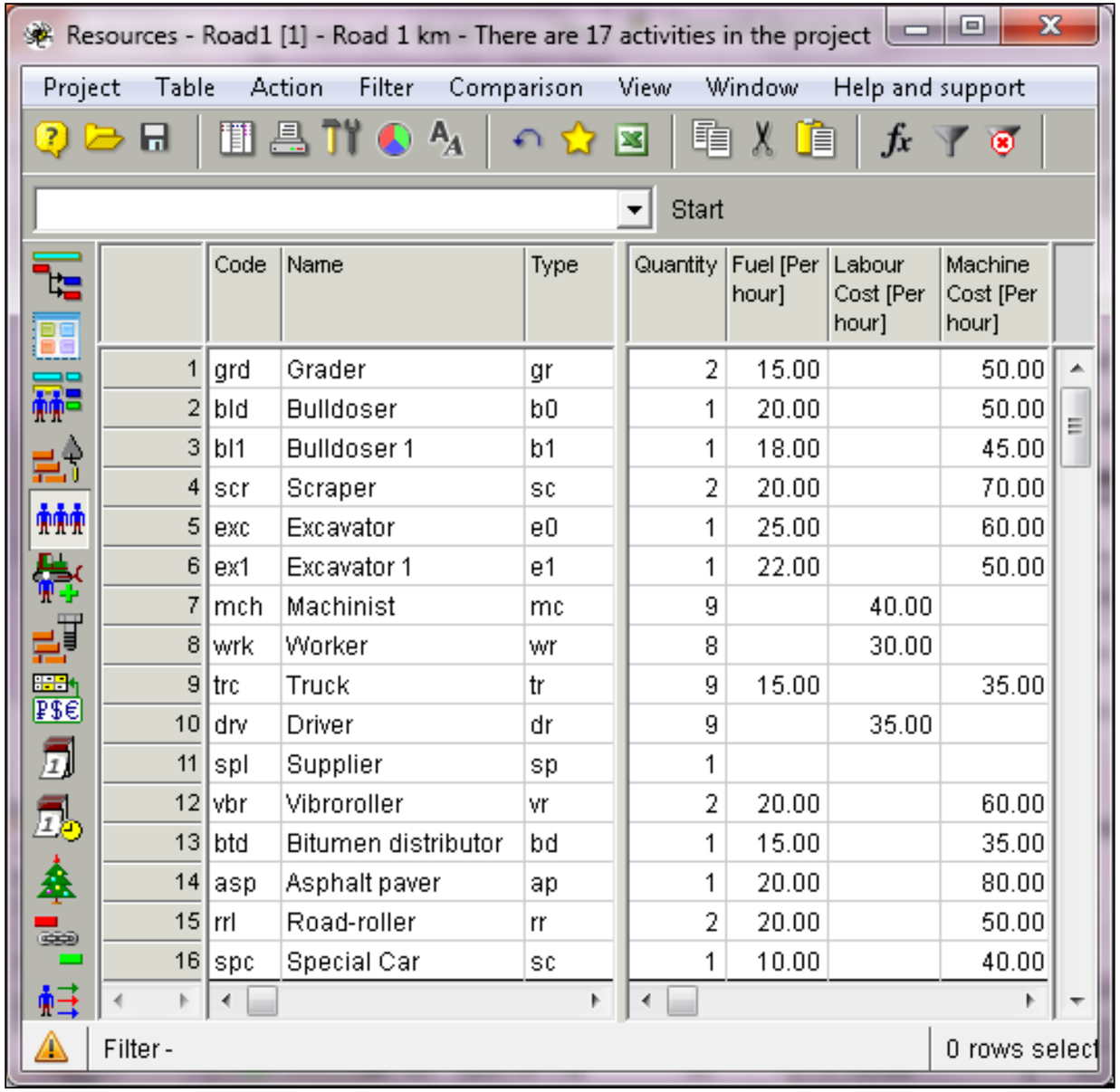
	Code	Name	Opt - Material Cost [Unit	Exp - Material Cost [Unit	Pes - Material Cost [Unit	Material Cost [Unit cost]
1	Fuel	Fuel	5.70	5.70	6.50	5.70
2	Bitm	Bitumen	4.80	4.80	5.50	4.80
3	CrSt	Crush Stone	9.00	9.00	11.00	9.00
4	Sand	Sand	9.00	9.00	11.00	9.00
5	Asph	Asphalt	48.00	48.00	55.00	48.00
6	Pnt_	Paint	67.00	67.00	75.00	67.00
7	Stl_	Steel	1 200.00	1 200.00	1 450.00	1 200.00
8	Sign	Sign	650.00	650.00	650.00	650.00

Step 6. Define Resources

Now we can define project resources and enter their available quantities.
In our project, machines consume fuel.

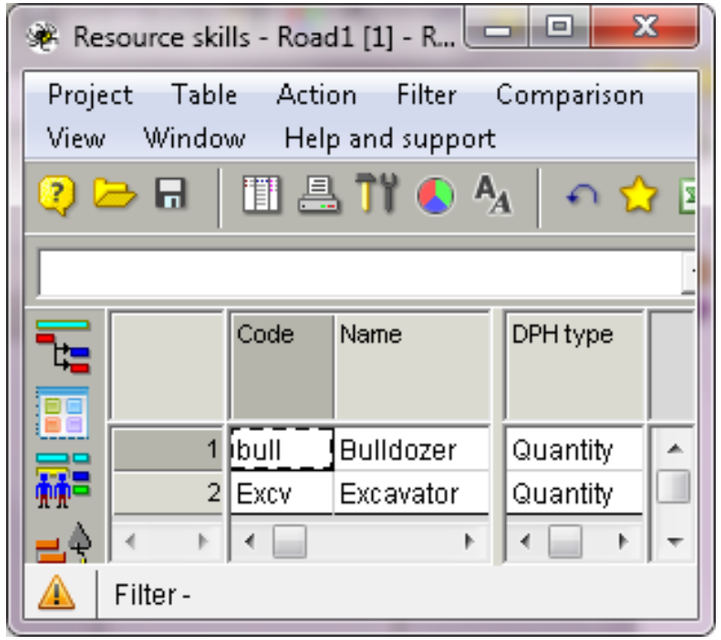
For labor resources, per-hour costs are entered as Labor cost component; for machines, the costs of work are entered as Machine cost component.

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



	Code	Name	Type	Quantity	Fuel [Per hour]	Labour Cost [Per hour]	Machine Cost [Per hour]
1	grd	Grader	gr	2	15.00		50.00
2	bld	Bulldoser	b0	1	20.00		50.00
3	bl1	Bulldoser 1	b1	1	18.00		45.00
4	scr	Scraper	sc	2	20.00		70.00
5	exc	Excavator	e0	1	25.00		60.00
6	ex1	Excavator 1	e1	1	22.00		50.00
7	mch	Machinist	mc	9		40.00	
8	wrk	Worker	wr	8		30.00	
9	trc	Truck	tr	9	15.00		35.00
10	drv	Driver	dr	9		35.00	
11	spl	Supplier	sp	1			
12	vbr	Vibroroller	vr	2	20.00		60.00
13	btd	Bitumen distributor	bd	1	15.00		35.00
14	asp	Asphalt paver	ap	1	20.00		80.00
15	rrl	Road-roller	rr	2	20.00		50.00
16	spc	Special Car	sc	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.

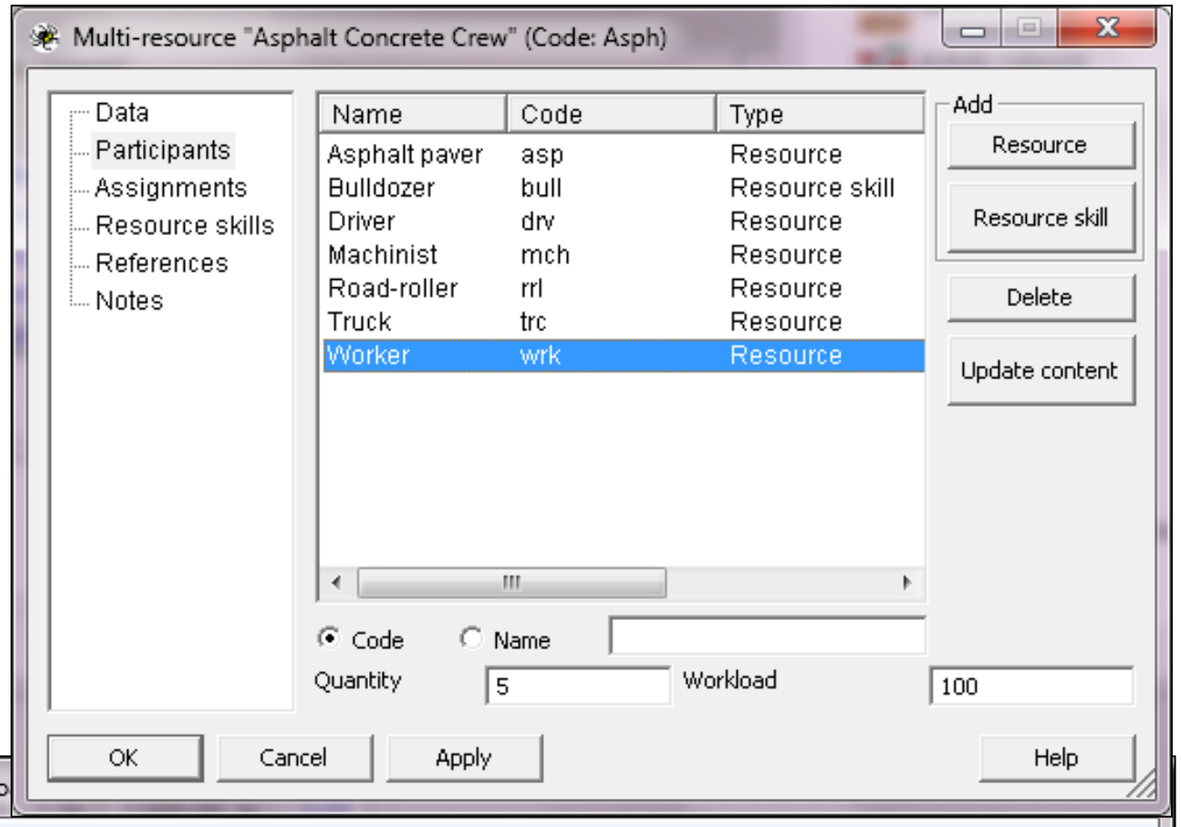
Step 8. Define Crews

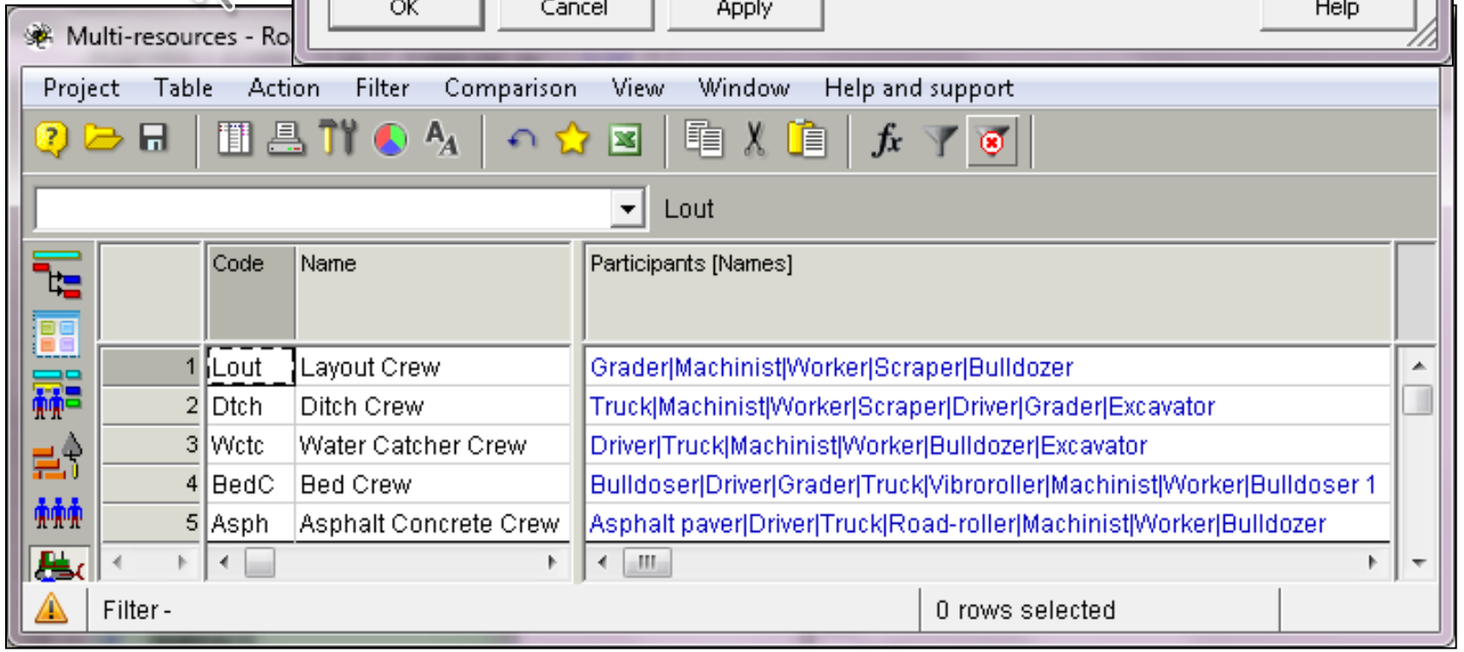
Now we proceed to creating the resource crews and then to assigning these crews to project activities.

Resource crews can include both concrete resources and resource skills and we will know who must do what only after project leveling.

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

This feature is very helpful for what if analysis and finding the best ways for project acceleration.



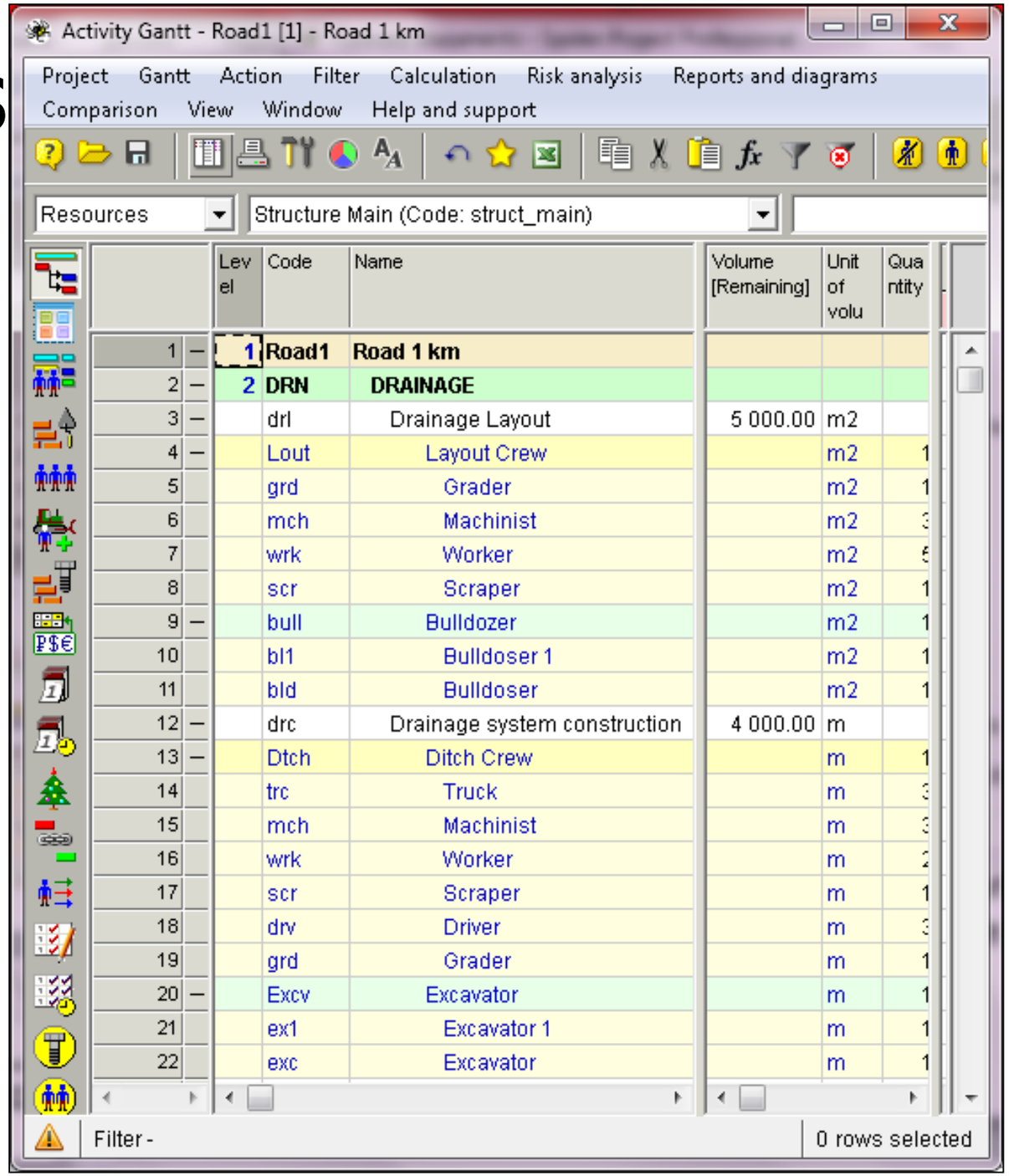


Step 9. Assign Resources

Now, the crews (called multi-resources) can 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. Besides, at any moment the user can add or remove some resources to selected resource crews and estimate its impact on project schedule and budget.

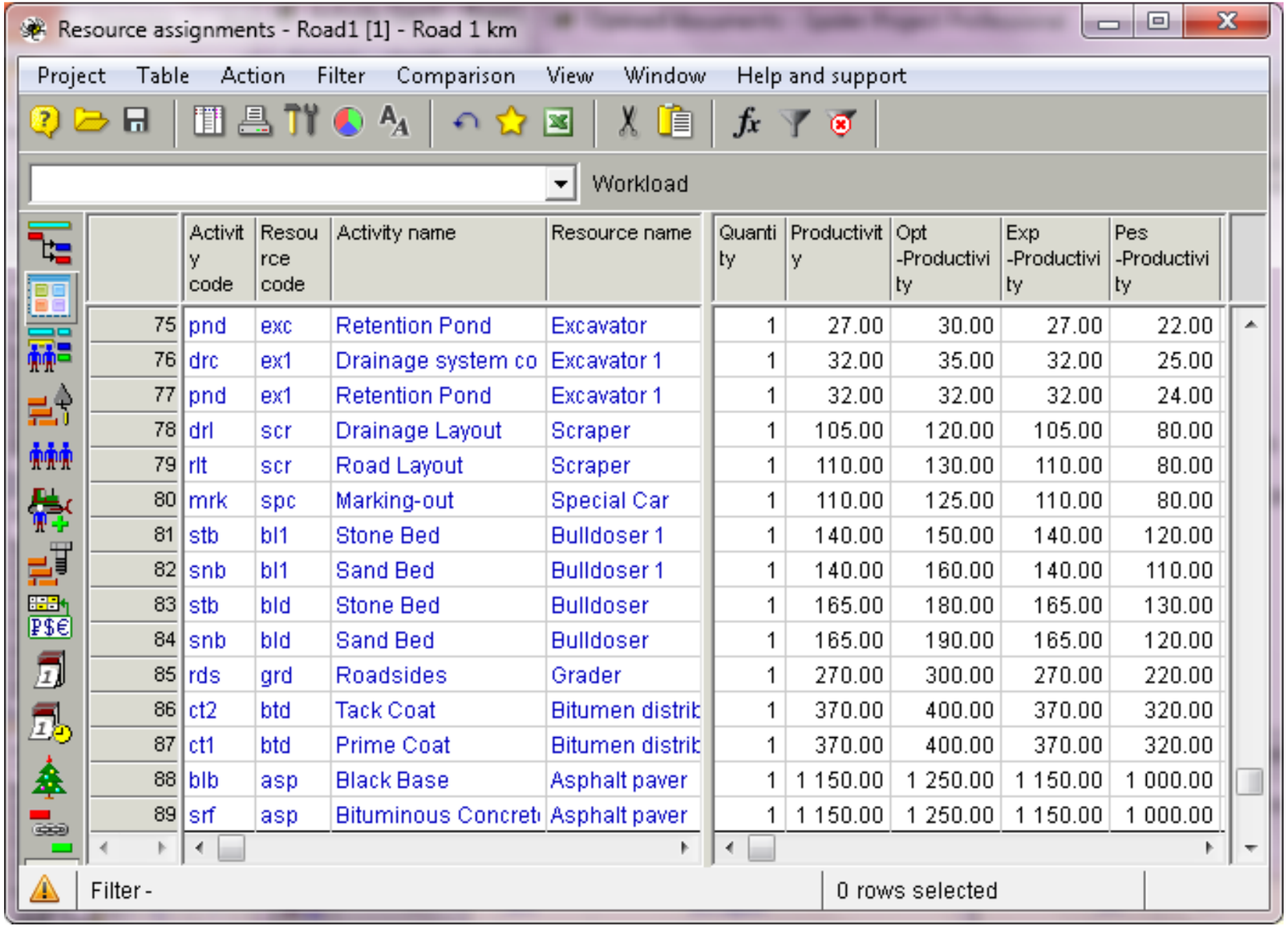


	Level	Code	Name	Volume [Remaining]	Unit of volu	Quantity
1	1	Road1	Road 1 km			
2	2	DRN	DRAINAGE			
3		drl	Drainage Layout	5 000.00	m2	
4		Lout	Layout Crew		m2	1
5		grd	Grader		m2	1
6		mch	Machinist		m2	3
7		wrk	Worker		m2	5
8		scr	Scraper		m2	1
9		bull	Bulldozer		m2	1
10		bl1	Bulldoser 1		m2	1
11		bld	Bulldoser		m2	1
12		drc	Drainage system construction	4 000.00	m	
13		Dtch	Ditch Crew		m	1
14		trc	Truck		m	3
15		mch	Machinist		m	3
16		wrk	Worker		m	2
17		scr	Scraper		m	1
18		drv	Driver		m	3
19		grd	Grader		m	1
20		Excv	Excavator		m	1
21		ex1	Excavator 1		m	1
22		exc	Excavator		m	1

Step 10. Define Resource Productivity

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

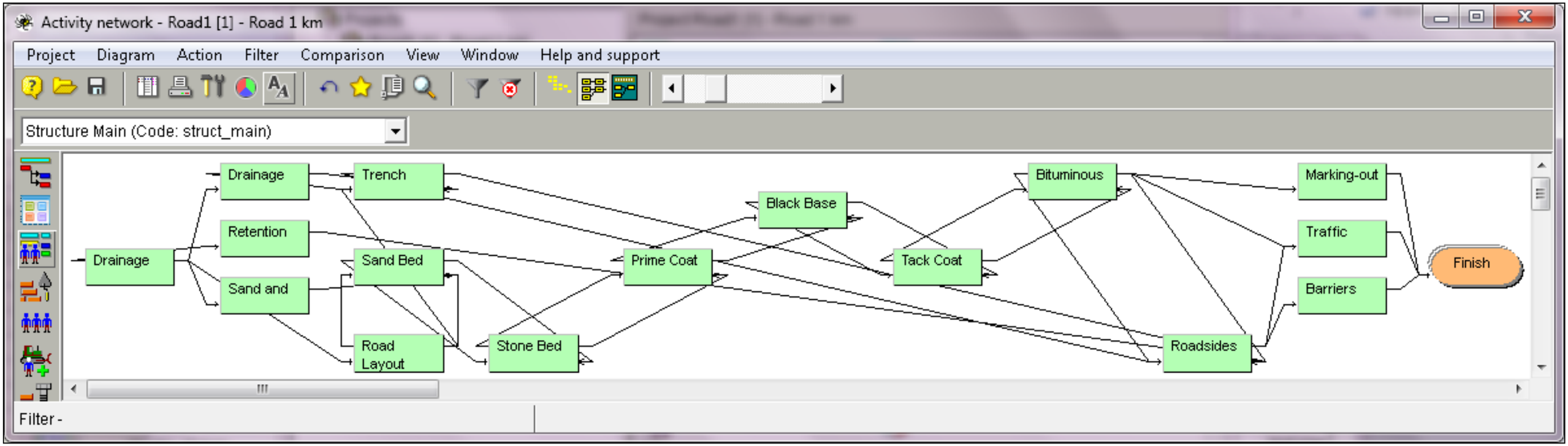
We will discuss risk simulation and so we will enter optimistic, most likely and pessimistic values of assigned resource productivities.



	Activity code	Resource code	Activity name	Resource name	Quantity	Productivity	Opt -Productivity	Exp -Productivity	Pes -Productivity
75	pnd	exc	Retention Pond	Excavator	1	27.00	30.00	27.00	22.00
76	drc	ex1	Drainage system co	Excavator 1	1	32.00	35.00	32.00	25.00
77	pnd	ex1	Retention Pond	Excavator 1	1	32.00	32.00	32.00	24.00
78	drl	scr	Drainage Layout	Scraper	1	105.00	120.00	105.00	80.00
79	rlt	scr	Road Layout	Scraper	1	110.00	130.00	110.00	80.00
80	mrk	spc	Marking-out	Special Car	1	110.00	125.00	110.00	80.00
81	stb	bl1	Stone Bed	Bulldoser 1	1	140.00	150.00	140.00	120.00
82	snb	bl1	Sand Bed	Bulldoser 1	1	140.00	160.00	140.00	110.00
83	stb	bld	Stone Bed	Bulldoser	1	165.00	180.00	165.00	130.00
84	snb	bld	Sand Bed	Bulldoser	1	165.00	190.00	165.00	120.00
85	rds	grd	Roadsides	Grader	1	270.00	300.00	270.00	220.00
86	ct2	btd	Tack Coat	Bitumen distrib	1	370.00	400.00	370.00	320.00
87	ct1	btd	Prime Coat	Bitumen distrib	1	370.00	400.00	370.00	320.00
88	blb	asp	Black Base	Asphalt paver	1	1 150.00	1 250.00	1 150.00	1 000.00
89	srf	asp	Bituminous Concret	Asphalt paver	1	1 150.00	1 250.00	1 150.00	1 000.00

Step 11. Define Activity Dependencies

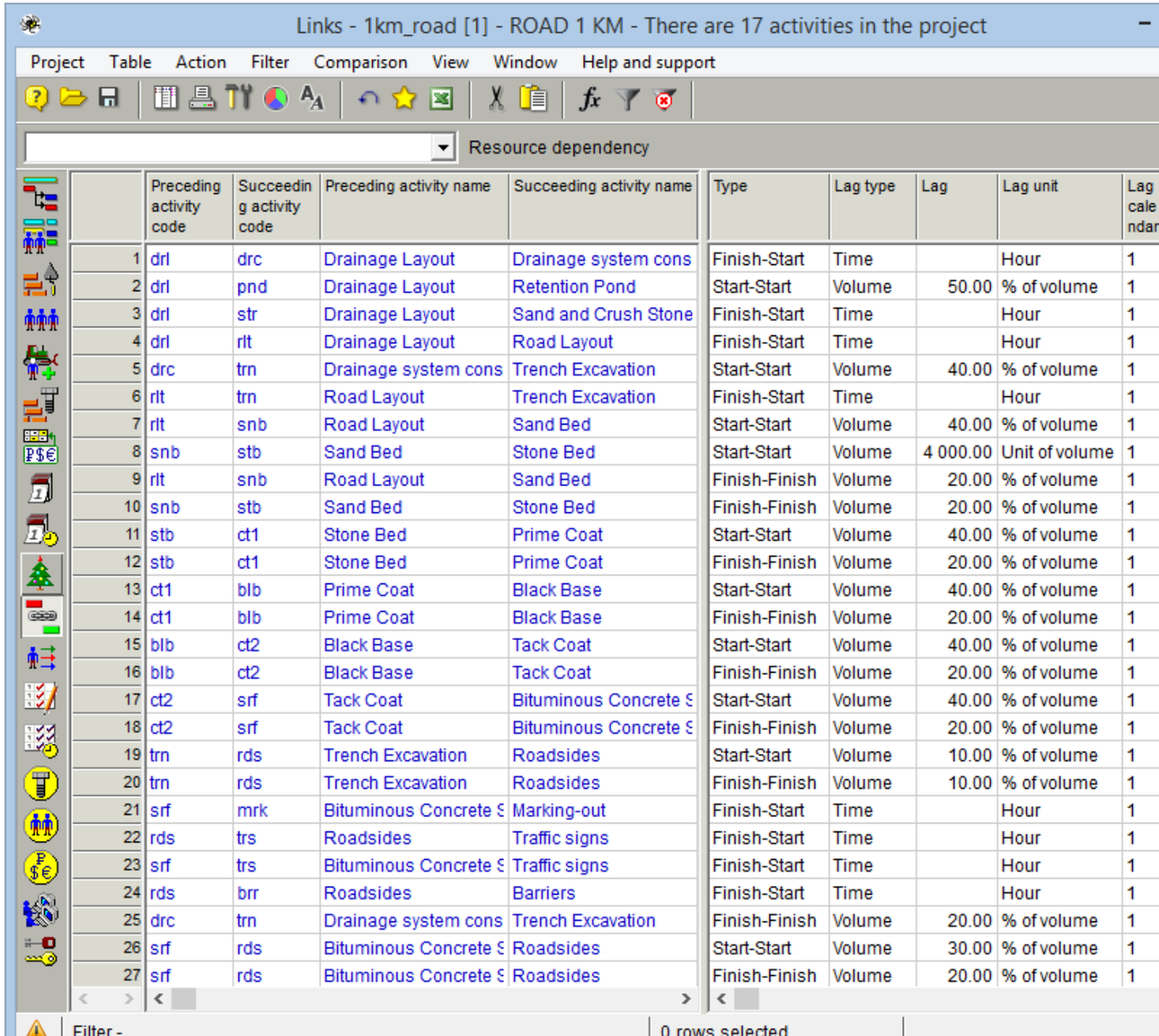
Spider Project supports all standard types of activity dependencies as well as additional double lag dependencies.
In Spider Project, you can define Time lags and Volume lags (in volume units or as percentage). For Time lags, it is possible to define special lag calendars. The number of links between any two activities is not limited.



Step 11. Link Table

Dependencies are created in the Gantt Chart using the mouse or by selecting predecessors and successors in activity properties dialog box but Spider Project automatically creates Link Table where activity dependencies can be analyzed, sorted, filtered, edited.

Applying filters in this table we can select to show in the Gantt Chart only filtered dependencies and only those activities that are linked with the filtered dependencies.



	Preceding activity code	Succeeding activity code	Preceding activity name	Succeeding activity name	Type	Lag type	Lag	Lag unit	Lag calendar
1	drl	drc	Drainage Layout	Drainage system cons	Finish-Start	Time		Hour	1
2	drl	pnd	Drainage Layout	Retention Pond	Start-Start	Volume	50.00	% of volume	1
3	drl	str	Drainage Layout	Sand and Crush Stone	Finish-Start	Time		Hour	1
4	drl	rlt	Drainage Layout	Road Layout	Finish-Start	Time		Hour	1
5	drc	trn	Drainage system cons	Trench Excavation	Start-Start	Volume	40.00	% of volume	1
6	rlt	trn	Road Layout	Trench Excavation	Finish-Start	Time		Hour	1
7	rlt	snb	Road Layout	Sand Bed	Start-Start	Volume	40.00	% of volume	1
8	snb	stb	Sand Bed	Stone Bed	Start-Start	Volume	4 000.00	Unit of volume	1
9	rlt	snb	Road Layout	Sand Bed	Finish-Finish	Volume	20.00	% of volume	1
10	snb	stb	Sand Bed	Stone Bed	Finish-Finish	Volume	20.00	% of volume	1
11	stb	ct1	Stone Bed	Prime Coat	Start-Start	Volume	40.00	% of volume	1
12	stb	ct1	Stone Bed	Prime Coat	Finish-Finish	Volume	20.00	% of volume	1
13	ct1	blb	Prime Coat	Black Base	Start-Start	Volume	40.00	% of volume	1
14	ct1	blb	Prime Coat	Black Base	Finish-Finish	Volume	20.00	% of volume	1
15	blb	ct2	Black Base	Tack Coat	Start-Start	Volume	40.00	% of volume	1
16	blb	ct2	Black Base	Tack Coat	Finish-Finish	Volume	20.00	% of volume	1
17	ct2	srf	Tack Coat	Bituminous Concrete S	Start-Start	Volume	40.00	% of volume	1
18	ct2	srf	Tack Coat	Bituminous Concrete S	Finish-Finish	Volume	20.00	% of volume	1
19	trn	rds	Trench Excavation	Roadsides	Start-Start	Volume	10.00	% of volume	1
20	trn	rds	Trench Excavation	Roadsides	Finish-Finish	Volume	10.00	% of volume	1
21	srf	mrk	Bituminous Concrete S	Marking-out	Finish-Start	Time		Hour	1
22	rds	trs	Roadsides	Traffic signs	Finish-Start	Time		Hour	1
23	srf	trs	Bituminous Concrete S	Traffic signs	Finish-Start	Time		Hour	1
24	rds	brr	Roadsides	Barriers	Finish-Start	Time		Hour	1
25	drc	trn	Drainage system cons	Trench Excavation	Finish-Finish	Volume	20.00	% of volume	1
26	srf	rds	Bituminous Concrete S	Roadsides	Start-Start	Volume	30.00	% of volume	1
27	srf	rds	Bituminous Concrete S	Roadsides	Finish-Finish	Volume	20.00	% of volume	1

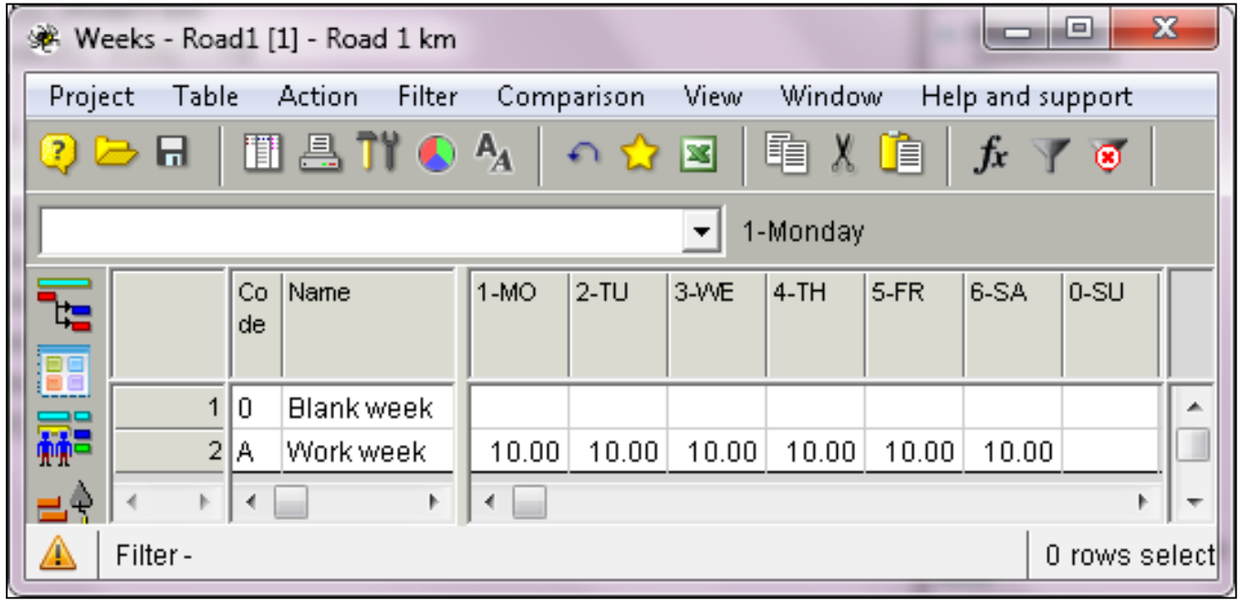
Step 12. Define Calendars

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

Calendars must be created and then assigned to project objects.

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

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



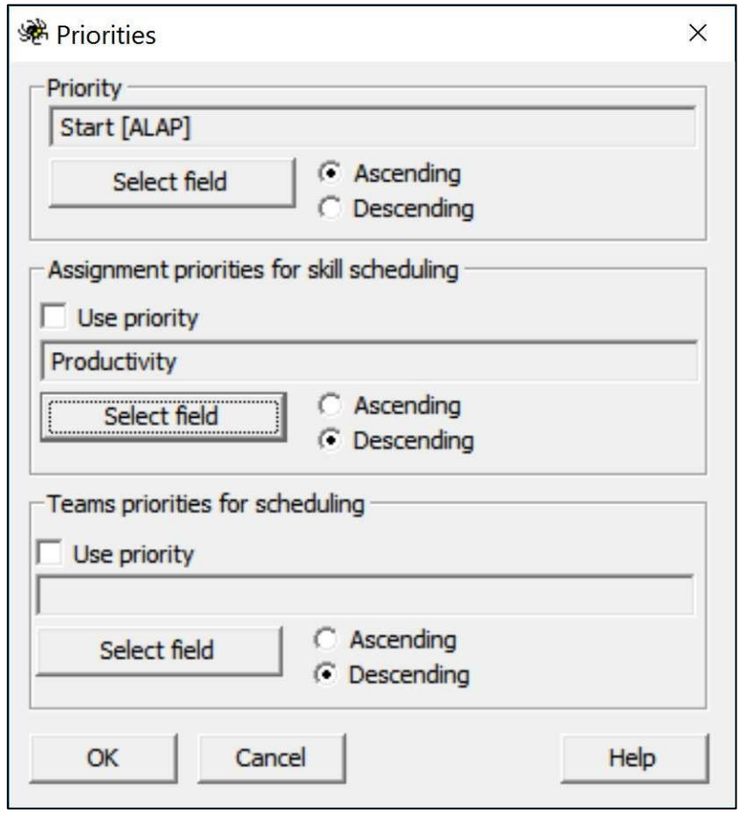
Next Steps

We are almost ready for scheduling.

Almost, because we have assigned resource skills but the selection of the concrete resources can 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 can set other priorities, e.g. maximum crew productivity.

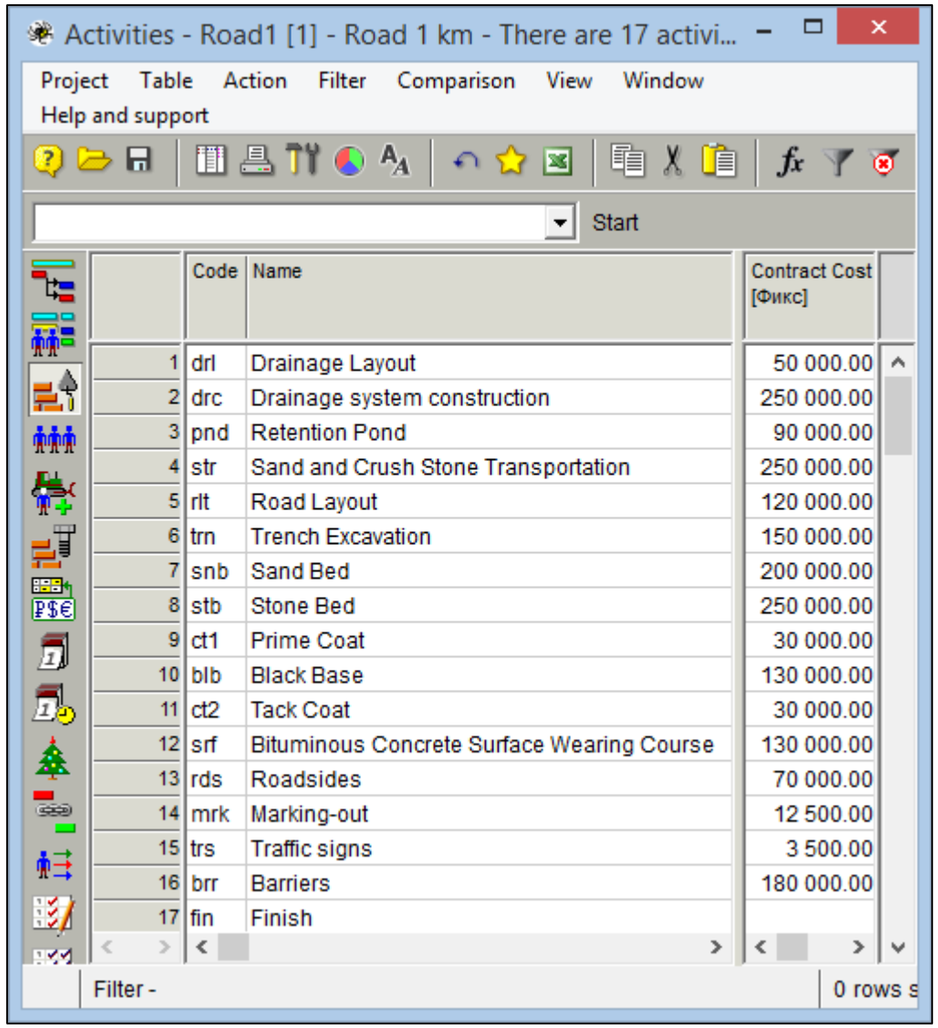


Step 13. Define activity contract costs

In our sample project, the expenses depend on resource and material costs, but the contract costs are assigned to activities directly.

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

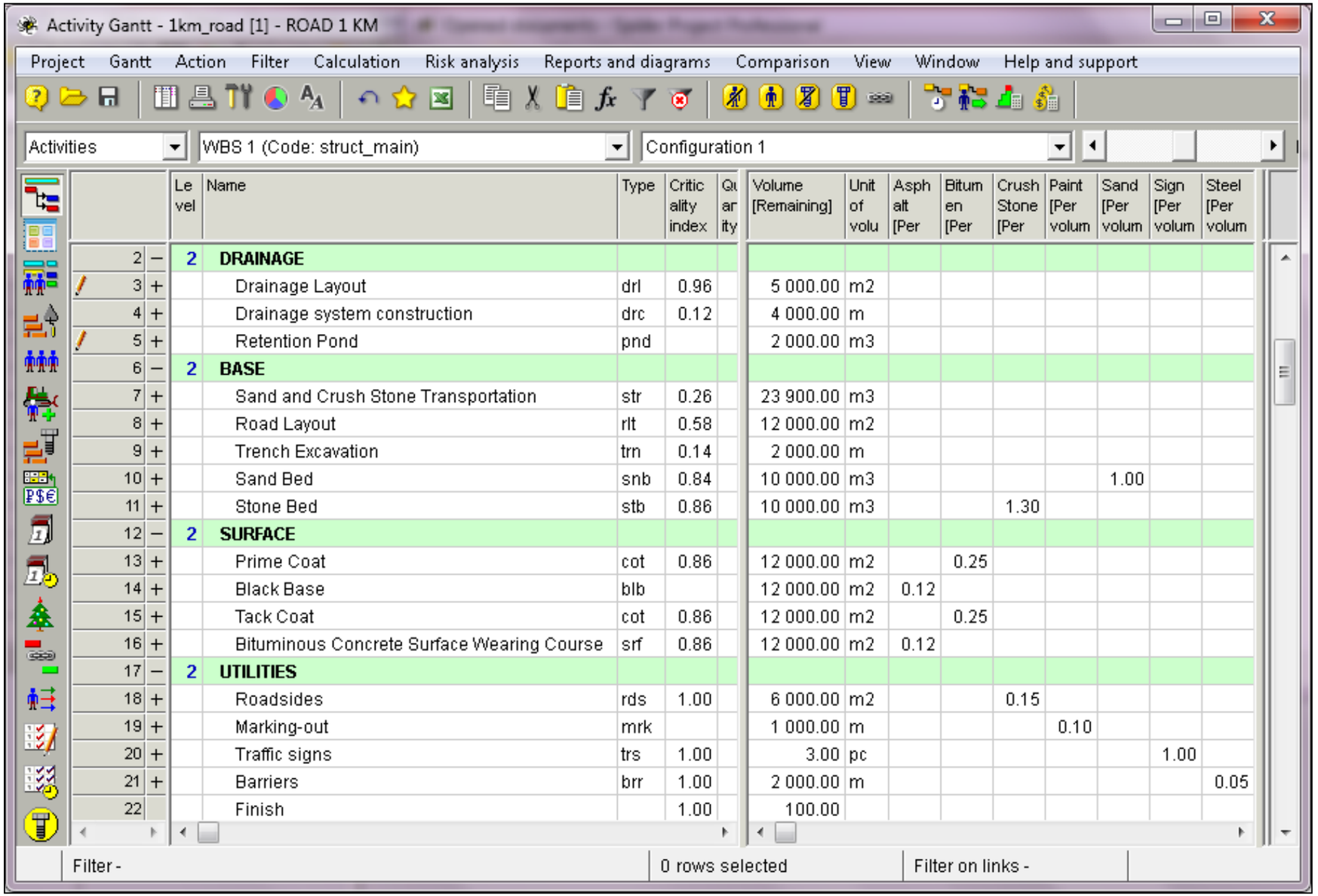
Besides, we have set the supplier cost as assignment cost and will pay the supplier certain amount for each activity volume unit.



	Code	Name	Contract Cost [Фикс]
1	drl	Drainage Layout	50 000.00
2	drc	Drainage system construction	250 000.00
3	pnd	Retention Pond	90 000.00
4	str	Sand and Crush Stone Transportation	250 000.00
5	rlt	Road Layout	120 000.00
6	trn	Trench Excavation	150 000.00
7	snb	Sand Bed	200 000.00
8	stb	Stone Bed	250 000.00
9	ct1	Prime Coat	30 000.00
10	blb	Black Base	130 000.00
11	ct2	Tack Coat	30 000.00
12	srf	Bituminous Concrete Surface Wearing Course	130 000.00
13	rds	Roadsides	70 000.00
14	mrk	Marking-out	12 500.00
15	trs	Traffic signs	3 500.00
16	brr	Barriers	180 000.00
17	fin	Finish	

Step 14. Assign materials

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



	Level	Name	Type	Criticality index	Quarity	Volume [Remaining]	Unit of volu	Asphalt [Per	Bitumen [Per	Crush Stone [Per	Paint [Per volum	Sand [Per volum	Sign [Per volum	Steel [Per volum
2	2	DRAINAGE												
3		Drainage Layout	drl	0.96		5 000.00	m2							
4		Drainage system construction	drc	0.12		4 000.00	m							
5		Retention Pond	pnd			2 000.00	m3							
6	2	BASE												
7		Sand and Crush Stone Transportation	str	0.26		23 900.00	m3							
8		Road Layout	rlt	0.58		12 000.00	m2							
9		Trench Excavation	trn	0.14		2 000.00	m							
10		Sand Bed	snb	0.84		10 000.00	m3					1.00		
11		Stone Bed	stb	0.86		10 000.00	m3			1.30				
12	2	SURFACE												
13		Prime Coat	cot	0.86		12 000.00	m2		0.25					
14		Black Base	blb			12 000.00	m2	0.12						
15		Tack Coat	cot	0.86		12 000.00	m2		0.25					
16		Bituminous Concrete Surface Wearing Course	srf	0.86		12 000.00	m2	0.12						
17	2	UTILITIES												
18		Roadsides	rds	1.00		6 000.00	m2			0.15				
19		Marking-out	mrk			1 000.00	m				0.10			
20		Traffic signs	trs	1.00		3.00	pc						1.00	
21		Barriers	brr	1.00		2 000.00	m							0.05
22		Finish		1.00		100.00								

Step 15. Schedule!

Now we are ready for resource-constrained scheduling:

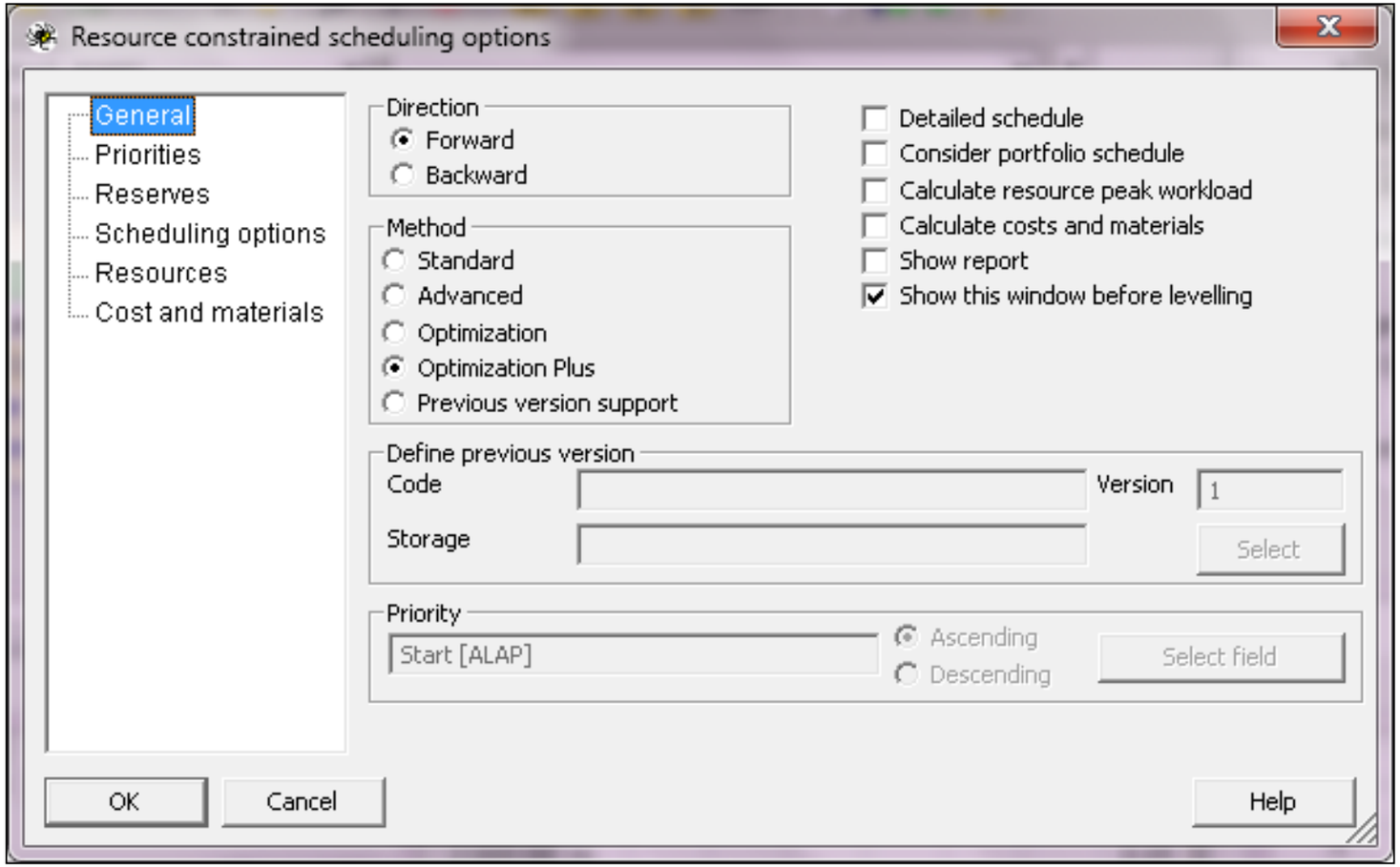
- We have defined project activities, resources, and materials
- We have created and assigned resource skills and crews
- We have assigned materials to project activities and resources
- We have defined activity, resource, materials, and assignment costs
- We have defined activity dependencies
- We have 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.

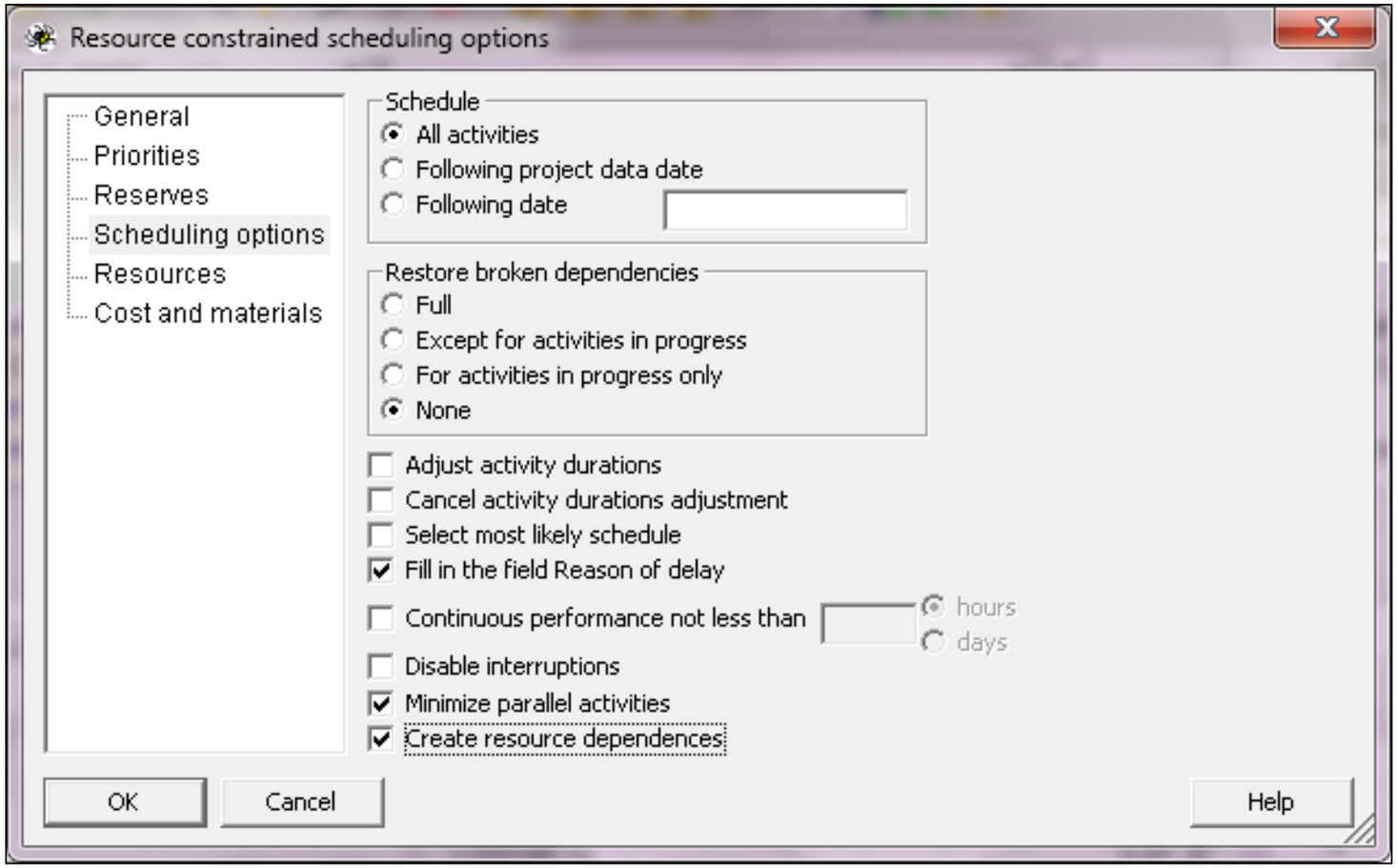
The Standard method implies manual selection of leveling priorities while Optimization Plus will find the best feasible schedule for our project automatically.



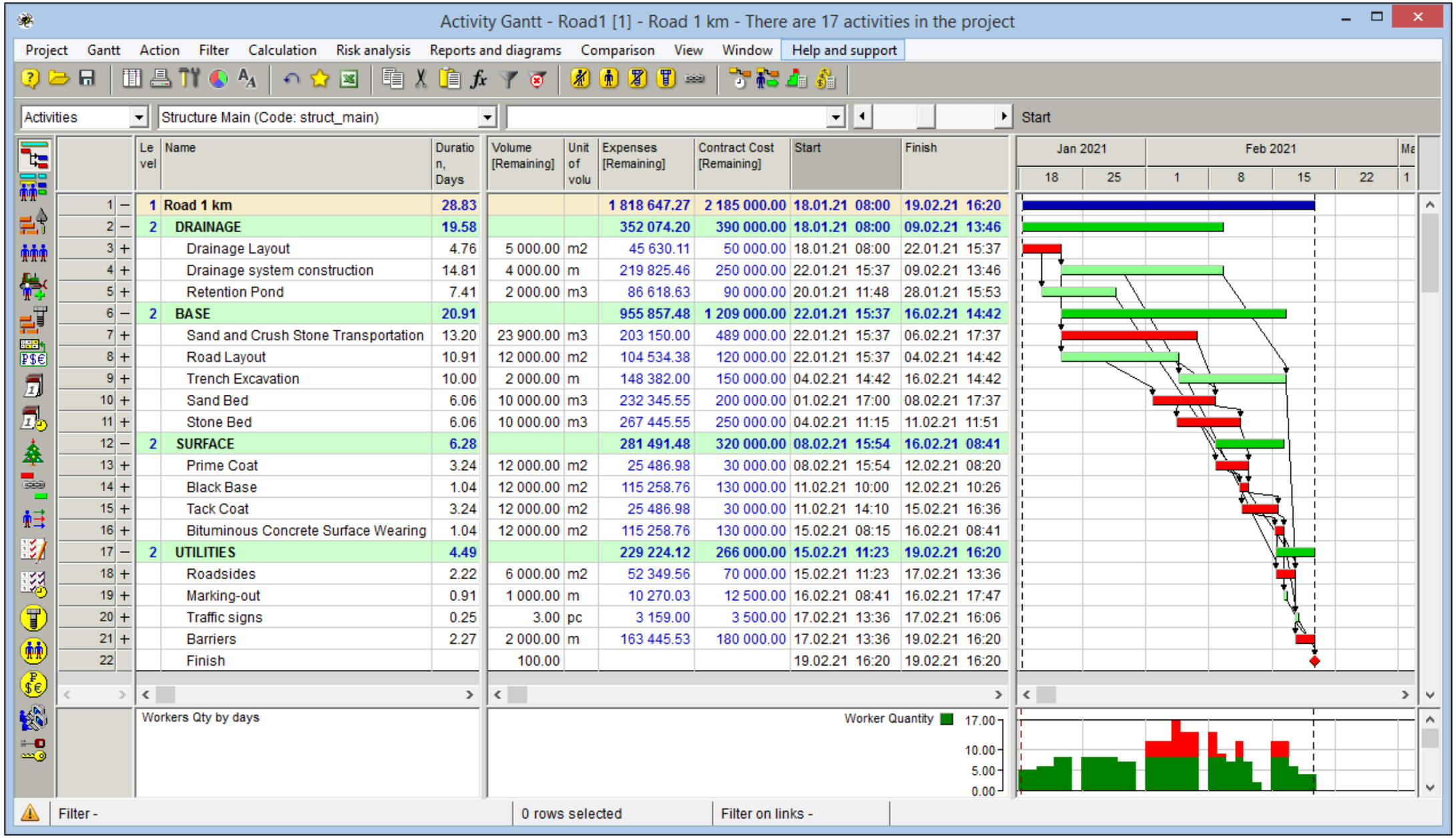
Step 15. Resource-constrained scheduling options

Leveling options include:

- if to use activity and WBS phases priorities,
- if to calculate activity Drags and Flexes,
- if to restore broken dependencies, if there are out of sequence activities,
- if to adjust (only increasing) activity duration for minimizing project duration,
- if to create resource dependencies and report reasons for activity delays,
- etc.

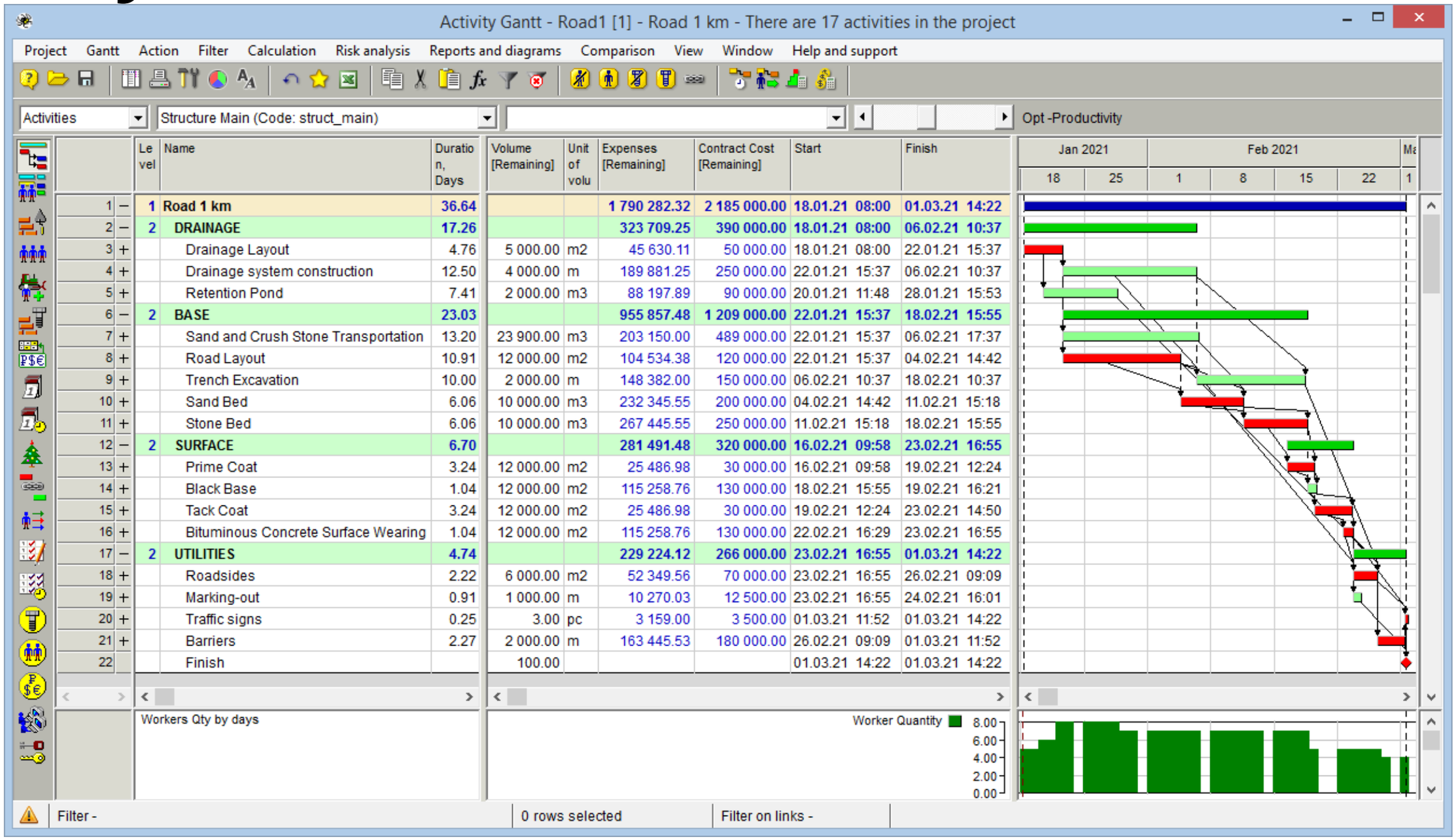


Project CPM Schedule



	Level	Name	Duration, Days	Volume [Remaining]	Unit of volu	Expenses [Remaining]	Contract Cost [Remaining]	Start	Finish
1	1	Road 1 km	28.83			1 818 647.27	2 185 000.00	18.01.21 08:00	19.02.21 16:20
2	2	DRAINAGE	19.58			352 074.20	390 000.00	18.01.21 08:00	09.02.21 13:46
3		Drainage Layout	4.76	5 000.00	m2	45 630.11	50 000.00	18.01.21 08:00	22.01.21 15:37
4		Drainage system construction	14.81	4 000.00	m	219 825.46	250 000.00	22.01.21 15:37	09.02.21 13:46
5		Retention Pond	7.41	2 000.00	m3	86 618.63	90 000.00	20.01.21 11:48	28.01.21 15:53
6	2	BASE	20.91			955 857.48	1 209 000.00	22.01.21 15:37	16.02.21 14:42
7		Sand and Crush Stone Transportation	13.20	23 900.00	m3	203 150.00	489 000.00	22.01.21 15:37	06.02.21 17:37
8		Road Layout	10.91	12 000.00	m2	104 534.38	120 000.00	22.01.21 15:37	04.02.21 14:42
9		Trench Excavation	10.00	2 000.00	m	148 382.00	150 000.00	04.02.21 14:42	16.02.21 14:42
10		Sand Bed	6.06	10 000.00	m3	232 345.55	200 000.00	01.02.21 17:00	08.02.21 17:37
11		Stone Bed	6.06	10 000.00	m3	267 445.55	250 000.00	04.02.21 11:15	11.02.21 11:51
12	2	SURFACE	6.28			281 491.48	320 000.00	08.02.21 15:54	16.02.21 08:41
13		Prime Coat	3.24	12 000.00	m2	25 486.98	30 000.00	08.02.21 15:54	12.02.21 08:20
14		Black Base	1.04	12 000.00	m2	115 258.76	130 000.00	11.02.21 10:00	12.02.21 10:26
15		Tack Coat	3.24	12 000.00	m2	25 486.98	30 000.00	11.02.21 14:10	15.02.21 16:36
16		Bituminous Concrete Surface Wearing	1.04	12 000.00	m2	115 258.76	130 000.00	15.02.21 08:15	16.02.21 08:41
17	2	UTILITIES	4.49			229 224.12	266 000.00	15.02.21 11:23	19.02.21 16:20
18		Roadsides	2.22	6 000.00	m2	52 349.56	70 000.00	15.02.21 11:23	17.02.21 13:36
19		Marking-out	0.91	1 000.00	m	10 270.03	12 500.00	16.02.21 08:41	16.02.21 17:47
20		Traffic signs	0.25	3.00	pc	3 159.00	3 500.00	17.02.21 13:36	17.02.21 16:06
21		Barriers	2.27	2 000.00	m	163 445.53	180 000.00	17.02.21 13:36	19.02.21 16:20
22		Finish		100.00				19.02.21 16:20	19.02.21 16:20

Project Resource Constrained Schedule



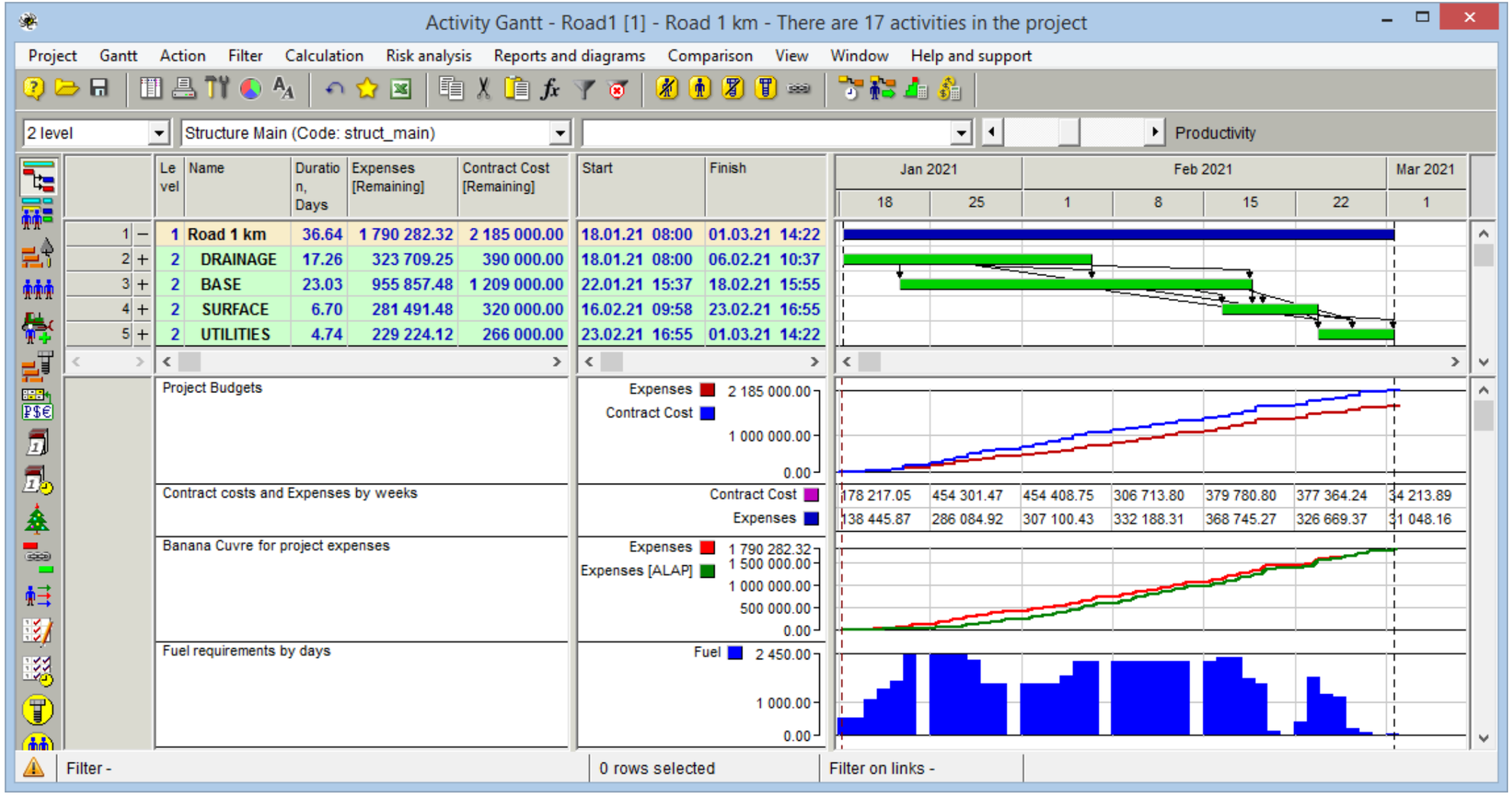
	Level	Name	Duration, Days	Volume [Remaining]	Unit of volu	Expenses [Remaining]	Contract Cost [Remaining]	Start	Finish
1	1	Road 1 km	36.64			1 790 282.32	2 185 000.00	18.01.21 08:00	01.03.21 14:22
2	2	DRAINAGE	17.26			323 709.25	390 000.00	18.01.21 08:00	06.02.21 10:37
3		Drainage Layout	4.76	5 000.00	m2	45 630.11	50 000.00	18.01.21 08:00	22.01.21 15:37
4		Drainage system construction	12.50	4 000.00	m	189 881.25	250 000.00	22.01.21 15:37	06.02.21 10:37
5		Retention Pond	7.41	2 000.00	m3	88 197.89	90 000.00	20.01.21 11:48	28.01.21 15:53
6	2	BASE	23.03			955 857.48	1 209 000.00	22.01.21 15:37	18.02.21 15:55
7		Sand and Crush Stone Transportation	13.20	23 900.00	m3	203 150.00	489 000.00	22.01.21 15:37	06.02.21 17:37
8		Road Layout	10.91	12 000.00	m2	104 534.38	120 000.00	22.01.21 15:37	04.02.21 14:42
9		Trench Excavation	10.00	2 000.00	m	148 382.00	150 000.00	06.02.21 10:37	18.02.21 10:37
10		Sand Bed	6.06	10 000.00	m3	232 345.55	200 000.00	04.02.21 14:42	11.02.21 15:18
11		Stone Bed	6.06	10 000.00	m3	267 445.55	250 000.00	11.02.21 15:18	18.02.21 15:55
12	2	SURFACE	6.70			281 491.48	320 000.00	16.02.21 09:58	23.02.21 16:55
13		Prime Coat	3.24	12 000.00	m2	25 486.98	30 000.00	16.02.21 09:58	19.02.21 12:24
14		Black Base	1.04	12 000.00	m2	115 258.76	130 000.00	18.02.21 15:55	19.02.21 16:21
15		Tack Coat	3.24	12 000.00	m2	25 486.98	30 000.00	19.02.21 12:24	23.02.21 14:50
16		Bituminous Concrete Surface Wearing	1.04	12 000.00	m2	115 258.76	130 000.00	22.02.21 16:29	23.02.21 16:55
17	2	UTILITIES	4.74			229 224.12	266 000.00	23.02.21 16:55	01.03.21 14:22
18		Roadsides	2.22	6 000.00	m2	52 349.56	70 000.00	23.02.21 16:55	26.02.21 09:09
19		Marking-out	0.91	1 000.00	m	10 270.03	12 500.00	23.02.21 16:55	24.02.21 16:01
20		Traffic signs	0.25	3.00	pc	3 159.00	3 500.00	01.03.21 11:52	01.03.21 14:22
21		Barriers	2.27	2 000.00	m	163 445.53	180 000.00	26.02.21 09:09	01.03.21 11:52
22		Finish		100.00				01.03.21 14:22	01.03.21 14:22

Project Resource Constrained Schedule

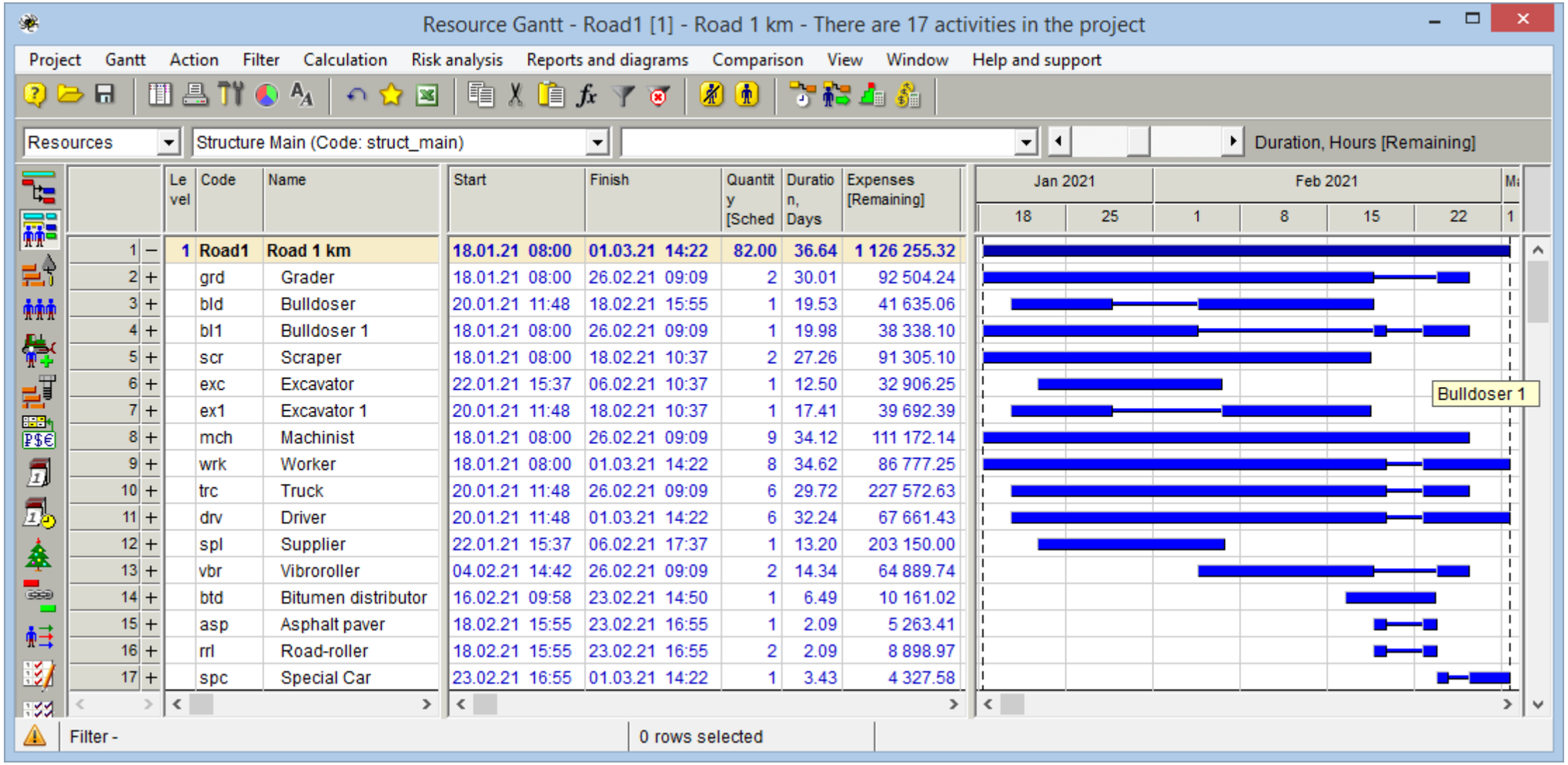
Spider Project calculated resource constrained floats and determined Resource Critical Path – the sequence of activities with zero resource constrained floats.
Activity is resource critical if its delay delays project finish in resource-constrained schedule.
Spider Project optimizes resource-constrained schedules.
Resource constrained schedules calculated by Spider Project are usually shorter than the schedules calculated for the same projects by other tools.
Besides, other tools do not calculate right resource constrained floats and so do not determine Resource Critical Path also known as Critical Chain.

Project Budgets

When the schedule is known project budgets and time distribution of resource requirements can be calculated. In our project we have Expenses budget and Contract budget.



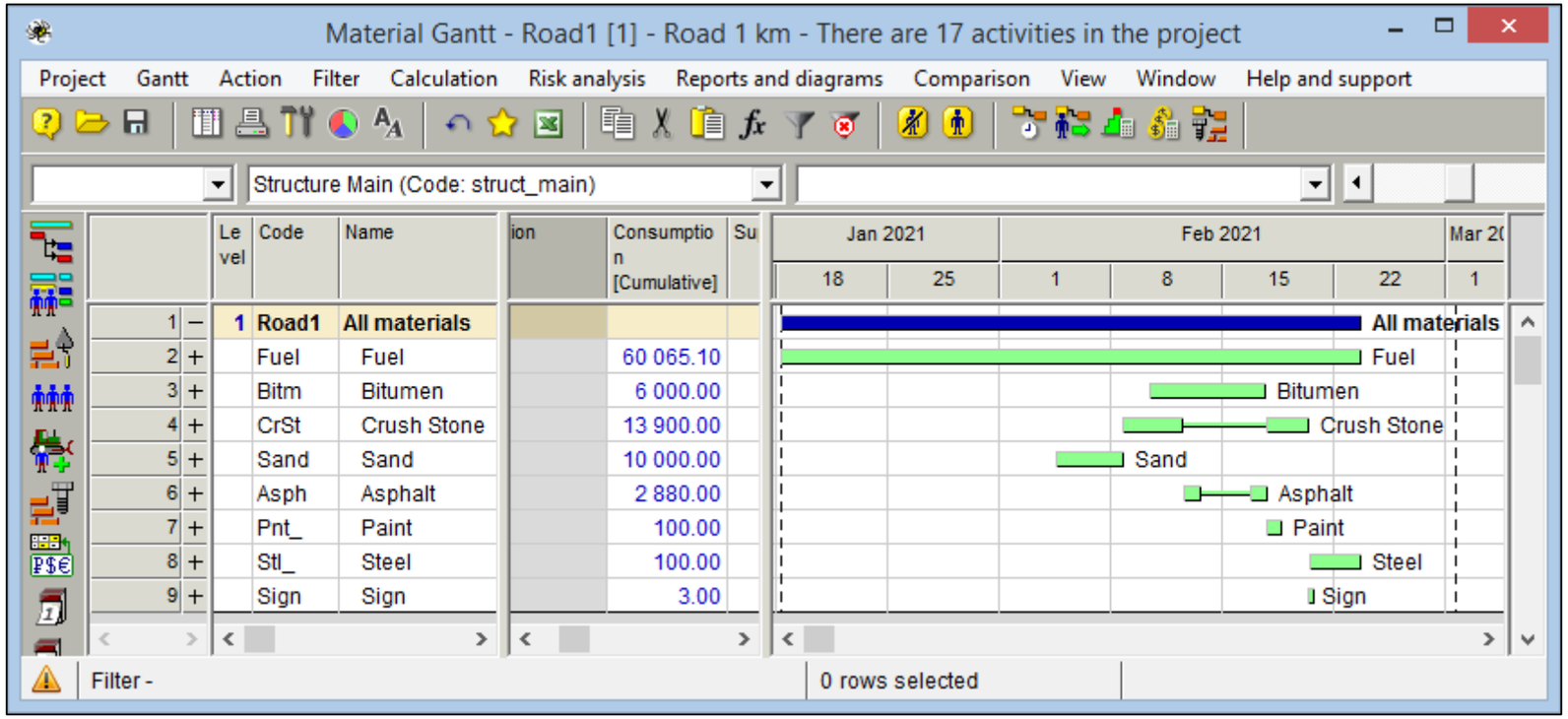
Resource Gantt Chart



	Level	Code	Name	Start	Finish	Quantity [Sched	Duration, Days	Expenses [Remaining]
1	1	Road1	Road 1 km	18.01.21 08:00	01.03.21 14:22	82.00	36.64	1 126 255.32
2		grd	Grader	18.01.21 08:00	26.02.21 09:09	2	30.01	92 504.24
3		bld	Bulldoser	20.01.21 11:48	18.02.21 15:55	1	19.53	41 635.06
4		bl1	Bulldoser 1	18.01.21 08:00	26.02.21 09:09	1	19.98	38 338.10
5		scr	Scraper	18.01.21 08:00	18.02.21 10:37	2	27.26	91 305.10
6		exc	Excavator	22.01.21 15:37	06.02.21 10:37	1	12.50	32 906.25
7		ex1	Excavator 1	20.01.21 11:48	18.02.21 10:37	1	17.41	39 692.39
8		mch	Machinist	18.01.21 08:00	26.02.21 09:09	9	34.12	111 172.14
9		wrk	Worker	18.01.21 08:00	01.03.21 14:22	8	34.62	86 777.25
10		trc	Truck	20.01.21 11:48	26.02.21 09:09	6	29.72	227 572.63
11		drv	Driver	20.01.21 11:48	01.03.21 14:22	6	32.24	67 661.43
12		spl	Supplier	22.01.21 15:37	06.02.21 17:37	1	13.20	203 150.00
13		vbr	Vibroroller	04.02.21 14:42	26.02.21 09:09	2	14.34	64 889.74
14		btd	Bitumen distributor	16.02.21 09:58	23.02.21 14:50	1	6.49	10 161.02
15		asp	Asphalt paver	18.02.21 15:55	23.02.21 16:55	1	2.09	5 263.41
16		rrl	Road-roller	18.02.21 15:55	23.02.21 16:55	2	2.09	8 898.97
17		spc	Special Car	23.02.21 16:55	01.03.21 14:22	1	3.43	4 327.58

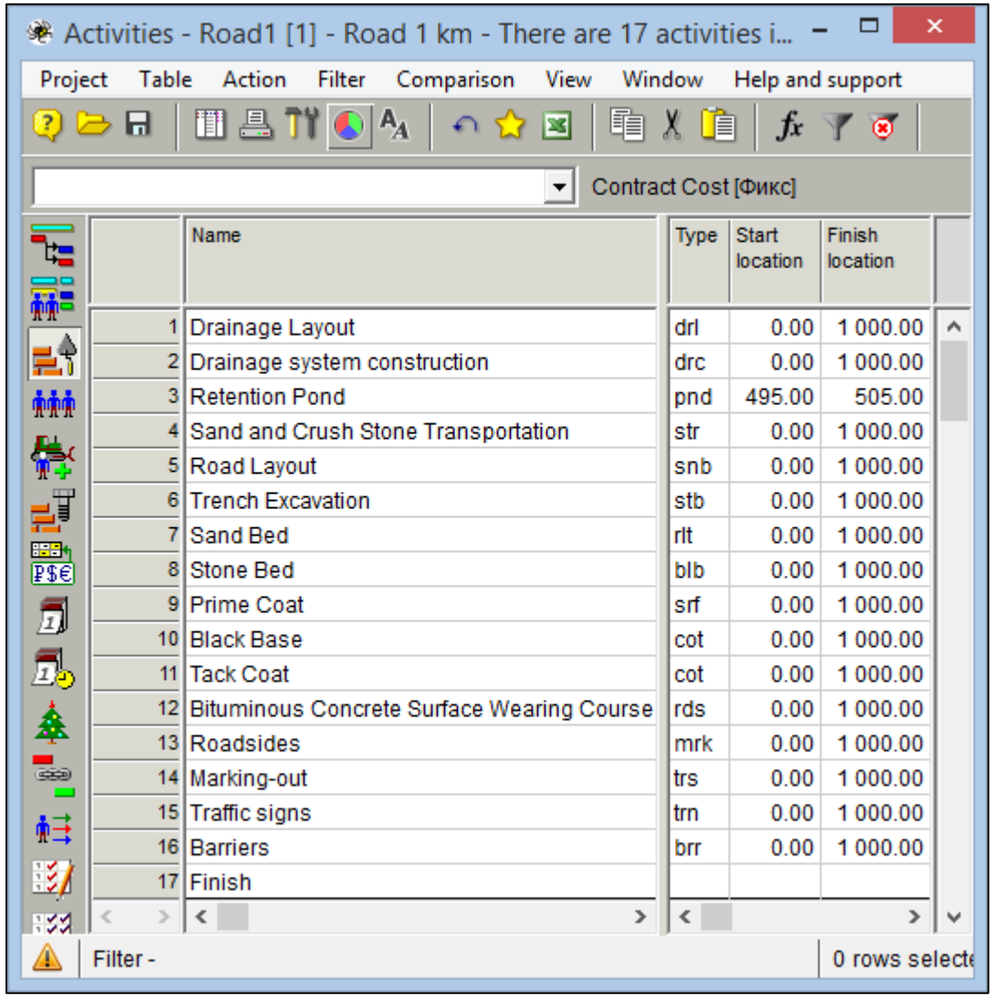
Material Gantt Chart

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



Activity and Resource Types

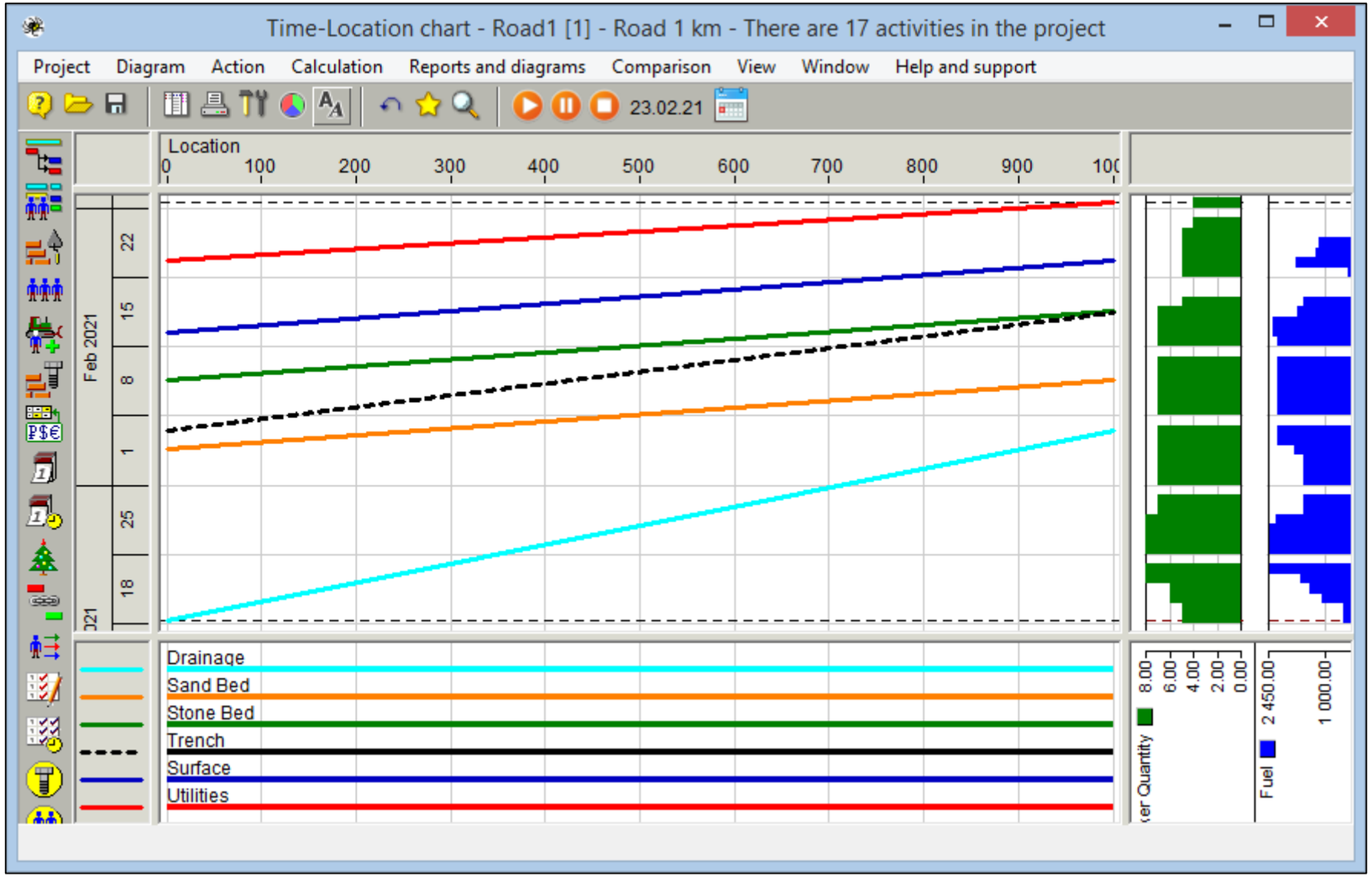
If we want to create and to use databases of the corporate norms and advanced reports like Time-Location Charts, 2D Charts or link Spider Project schedule model with 3D design it is necessary to enter activity types and locations.
Activities are of the same type if they have common characteristics like unit cost, material requirements per volume unit, assigned resource productivity, etc.
Resources are of the same type if they can do the same jobs with the same productivity.
Assignment types Spider Project generates automatically combining activity and assigned resource types.
In our project activity locations are defined by their start and end positions.



	Name	Type	Start location	Finish location
1	Drainage Layout	drl	0.00	1 000.00
2	Drainage system construction	drc	0.00	1 000.00
3	Retention Pond	pnd	495.00	505.00
4	Sand and Crush Stone Transportation	str	0.00	1 000.00
5	Road Layout	snb	0.00	1 000.00
6	Trench Excavation	stb	0.00	1 000.00
7	Sand Bed	rlt	0.00	1 000.00
8	Stone Bed	blb	0.00	1 000.00
9	Prime Coat	srf	0.00	1 000.00
10	Black Base	cot	0.00	1 000.00
11	Tack Coat	cot	0.00	1 000.00
12	Bituminous Concrete Surface Wearing Course	rds	0.00	1 000.00
13	Roadsides	mrk	0.00	1 000.00
14	Marking-out	trs	0.00	1 000.00
15	Traffic signs	trn	0.00	1 000.00
16	Barriers	brr	0.00	1 000.00
17	Finish			

Time-Location Chart

Time-Location Chart can be created basing on activity and/or phase type codes.



Reports

Spider Project creates any kinds of table and graphical reports

Road1 [1] - Phase "Road 1 km" (Co...

Document Table Action Filter Comparison Window Help and support

	Name	18.01.21	25.01.21	01.02.21	08.02.21	15.02.21	22.02.21	01.03.21
1	Road 1 km							
2	Asphalt paver					1	1	
3	Bulldoser 1	1	1	1		1	1	
4	Bulldoser	1	1	1	1	1		
5	Bitumen distributor					1	1	
6	Driver	6	6	6	6	6	6	1

Road1 [1] - Phase "Road 1 km" (Code: Road1) Structure "Structure Main" (Code: s...

Document Table Action Filter Comparison Window Help and support

Code

	Name	18.01.21	25.01.21	01.02.21	08.02.21	15.02.21	22.02.21	01.03.21	Total
1	Road 1 km								
2	Asphalt					1 440.00	1 440.00		2 880
3	Bitumen					4 442.19	1 557.81		6 000
4	Crush Stone				4 865.63	8 134.37	900.00		13 900
5	Fuel	7 628.54	12 775.90	11 018.27	13 320.00	10 351.28	4 907.32	63.78	60 065
6	Paint						100.00		100
7	Sand			3 842.80	6 157.20				10 000
8	Sign						3.00		3
9	Steel						71.94	28.06	100

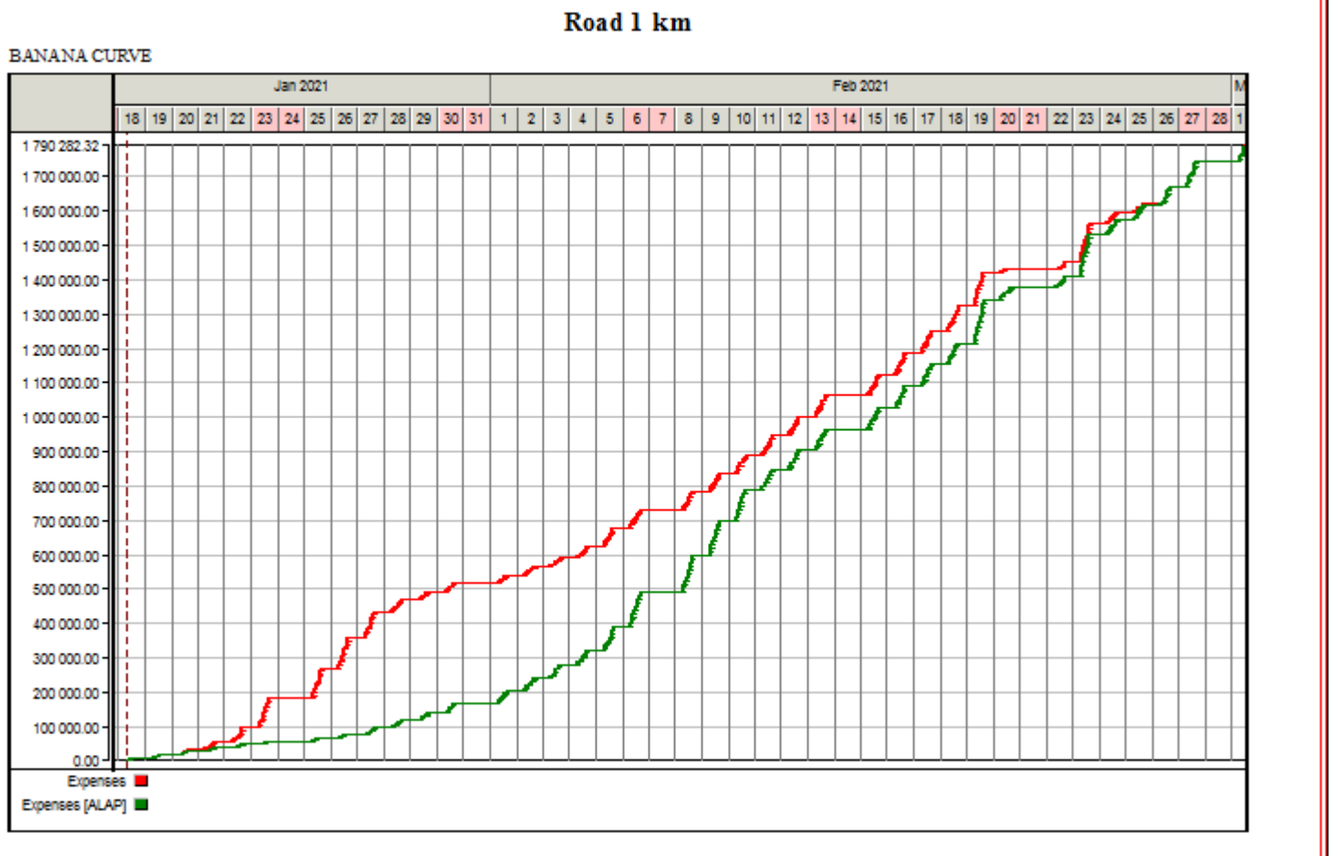
Road1 [1] - Phase "Road 1 km" (Code: Road1) Structure "Structure Main" (Code: struct_ma

Document Table Action Filter Comparison Window Help and support

Code

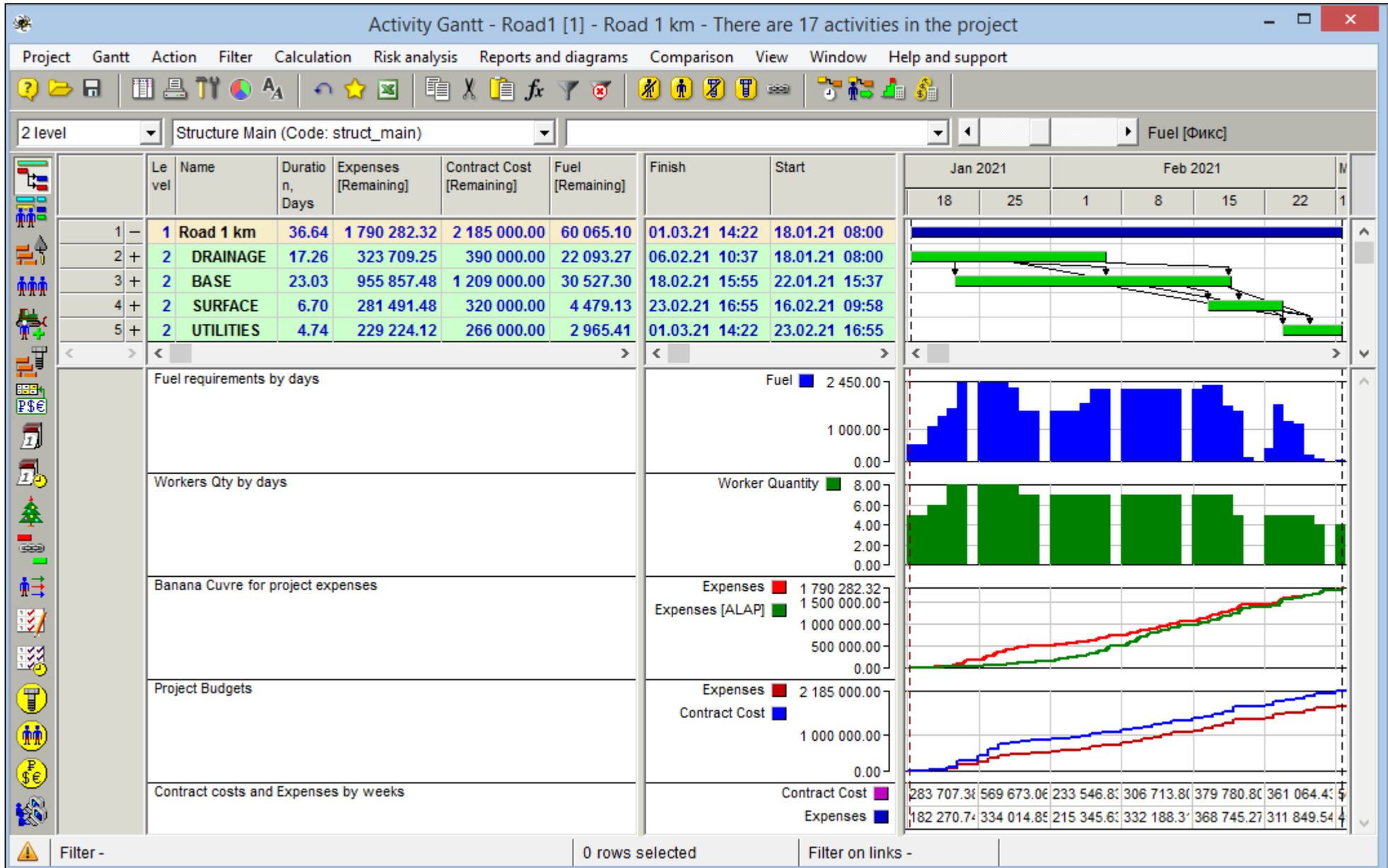
	Name	18.01.21	25.01.21	01.02.21	08.02.21	15.02.21	22.02.21
1	Road 1 km						
2	Expenses	182 270.74	516 285.59	731 631.23	1 063 819.53	1 432 564.80	1 744 4
3	Contract Cost	283 707.38	853 380.44	1 086 927.27	1 393 641.07	1 773 421.87	2 134 4
4	External services	62 879.16	203 150.00	203 150.00	203 150.00	203 150.00	203 1
5	Indirect Cost	27 551.90	72 262.06	121 957.21	198 616.05	283 711.11	355 6
6	Labour Cost	27 509.45	68 954.48	106 563.08	150 963.08	184 444.02	203 3
7	Machine Cost	20 847.54	55 613.74	86 266.29	122 266.29	149 781.41	163 1
8	Material Cost	43 482.69	116 305.31	213 694.65	388 824.12	611 478.26	819 1

Filter - 0 rows selected

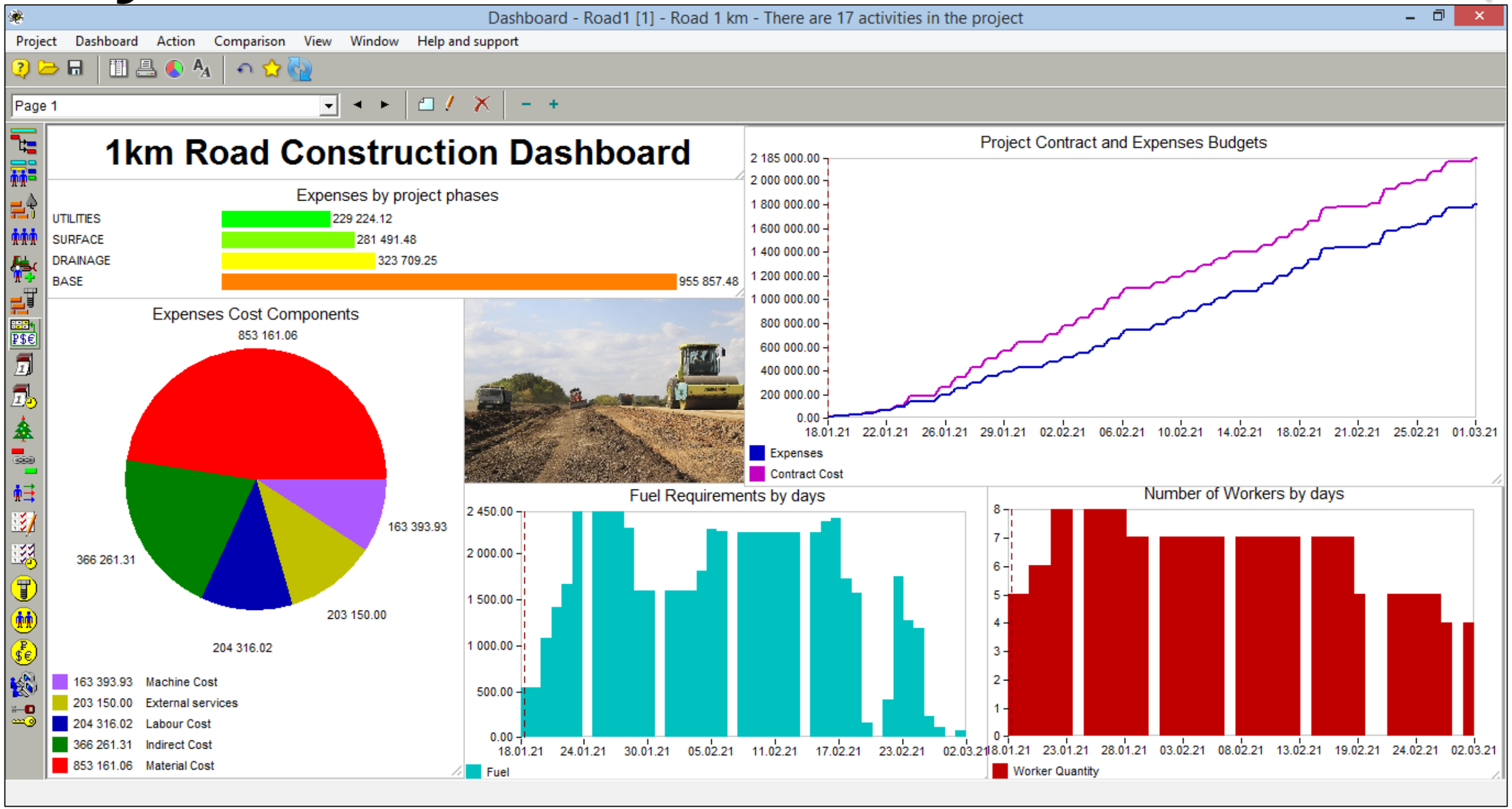


Reports

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



Project Dashboards



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.

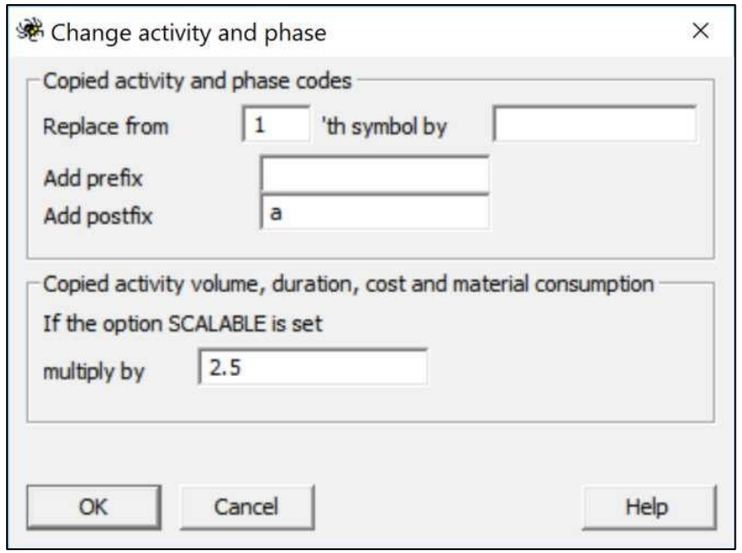
With this library, creating a project model is easy:

- 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 (in our example 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 the 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, 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

Resources [1] - Resources

Document Table Action Filter Comparison Window Help and support

	Code	Name	Type	Quantity	Fuel [Per hour]	Labour Cost [Per	Machine Cost [Per
1	grd	Grader	gr	2.00	15.00		50.00
2	bld	Bulldoser	b0	1.00	20.00		50.00
3	bl1	Bulldoser 1	b1	1.00	18.00		45.00
4	scr	Scraper	sc	2.00	20.00		70.00
5	exc	Excavator	e0	1.00	25.00		60.00
6	ex1	Excavator 1	e1	1.00	22.00		50.00
7	mch	Machinist	mc	9.00		40.00	
8	wrk	Worker	wr	8.00		30.00	
		Truck	tr	9.00	15.00		35.00
		Driver	dr	9.00		35.00	
		Supplier	sp	1.00			
		Vibroroller	vr	2.00	20.00		60.00
		Bitumen distributor	bd	1.00	15.00		35.00
		Asphalt paver	ap	1.00	20.00		80.00
		Road-roller	rr	2.00	20.00		50.00
		Special Car	sc	1.00	10.00		40.00

urce_assignment_productivities [1] - Resource assignme...

ent Table Action Filter Comparison Window Help and support

blb_ap

Type	Type name	Productivity	Unit of volume
blb_ap	Black Base Asphalt paver	1 150.00	m2
brr_wr	Barriers Worker	22.00	m
bsf_ap	Bituminous Concrete Surface Wearing Course Asphal	1 150.00	m2
cot_bd	Prime Coat Bitumen distributor	370.00	m2
drc_e0	Drainage system construction Excavator	32.00	m
drc_e1	Drainage system construction Excavator 1	27.00	m
drl_sc	Drainage Layout Scraper	105.00	m2
mrk_sc	Marking-out Special Car	110.00	m
pnd_e0	Retention Pond Excavator	32.00	m3
pnd_e1	Retention Pond Excavator 1	27.00	m3
rds_gr	Roadsides Grader	270.00	m2
rlt_sc	Road Layout Scraper	110.00	m2
snb_b0	Sand Bed Bulldoser	165.00	m3
snb_b1	Sand Bed Bulldoser 1	140.00	m3
stb_b0	Stone Bed Bulldoser	165.00	m3
stb_b1	Stone Bed Bulldoser 1	140.00	m3
trn_e0	Trench Excavation Excavator	22.00	m
trn_e1	Trench Excavation Excavator 1	20.00	m
trs_wr	Traffic signs Worker	0.60	pc

Cost_components [1] - Cost components

Document Table Action Filter Comparison Window Help and support

	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")*0.3
5	ext	External services	1.00	
6	cnc	Contract Cost	1.00	

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Multi-resources [1] - Multi-resources

son Window Help and support

Type

			pants [Names]	Participants [Numbers and codes]
1	Lout	Layout Crew	Grader|Machinist|Worker|Scraper|Bulldozer	1 grd R 100 |3 mch R 100 |5 wrk R 100 |1 scr R 100 |1 bull P 100
2	Dtch	Ditch Crew	Truck|Machinist|Worker|Scraper|Driver|Grader|Excavator	3 trc R 100 |3 mch R 100 |2 wrk R 100 |1 scr R 100 |3 drv R 100 |1 grd R 100 |1 Excv P 100
3	Wctc	Water Catcher Crew	Driver|Truck|Machinist|Worker|Bulldozer|Excavator	3 drv R 100 |3 trc R 100 |2 mch R 100 |1 wrk R 100 |1 bull P 100 |1 Excv P 100
4	BedC	Bed Crew	Driver|Grader|Truck|Vibroroller|Machinist|Worker|Bulldozer	3 drv R 100 |1 grd R 100 |3 trc R 100 |2 vbr R 100 |5 mch R 100 |5 wrk R 100 |1 bull P 100
5	Asph	Asphalt Concrete Crew	Asphalt paver|Driver|Truck|Road-roller|Machinist|Worker|Bulldozer	1 asp R 100 |6 drv R 100 |6 trc R 100 |2 rrl R 100 |3 mch R 100 |5 wrk R 100 |1 bull P 100

Filter - 0 rows selected

Reference Books

With the reference books, it is sufficient to enter activity 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 can 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 construction of 1 km 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 to enter three estimates (optimistic, most likely, and pessimistic) of the data used for project scheduling and budgeting.

We already entered these estimates for assigned resource productivities and material costs.

As was discussed earlier risk events Spider Project simulates by trigger activities.

Entering data uncertainty and adding risk events and probabilistic branches we create probabilistic model of our project.

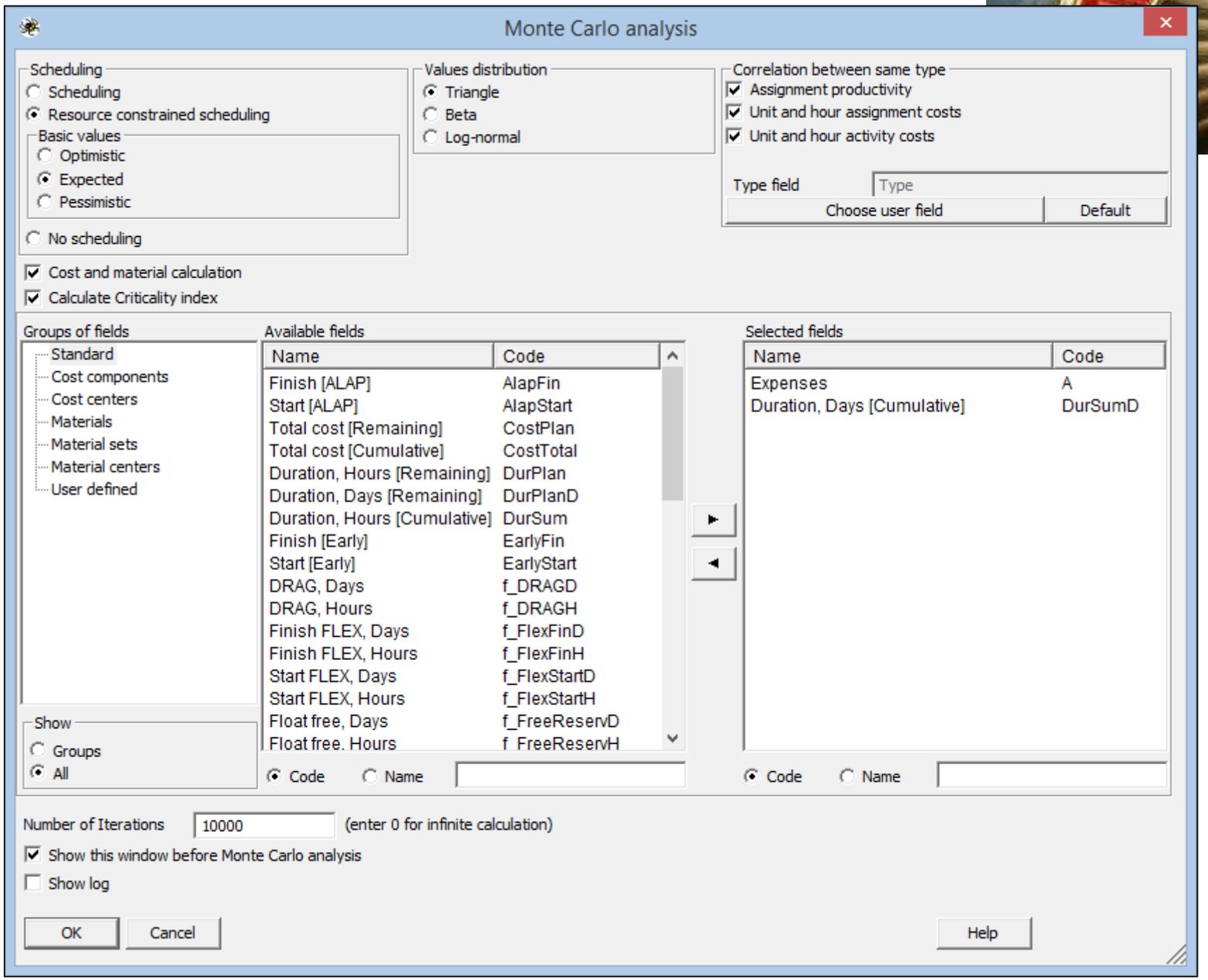
This is Spider Intro and our project is small and simple, so we will take into account data uncertainty but will not simulate risk events in our project.

MC Risk Simulation

Project probabilistic model is used for the Monte Carlo simulation.

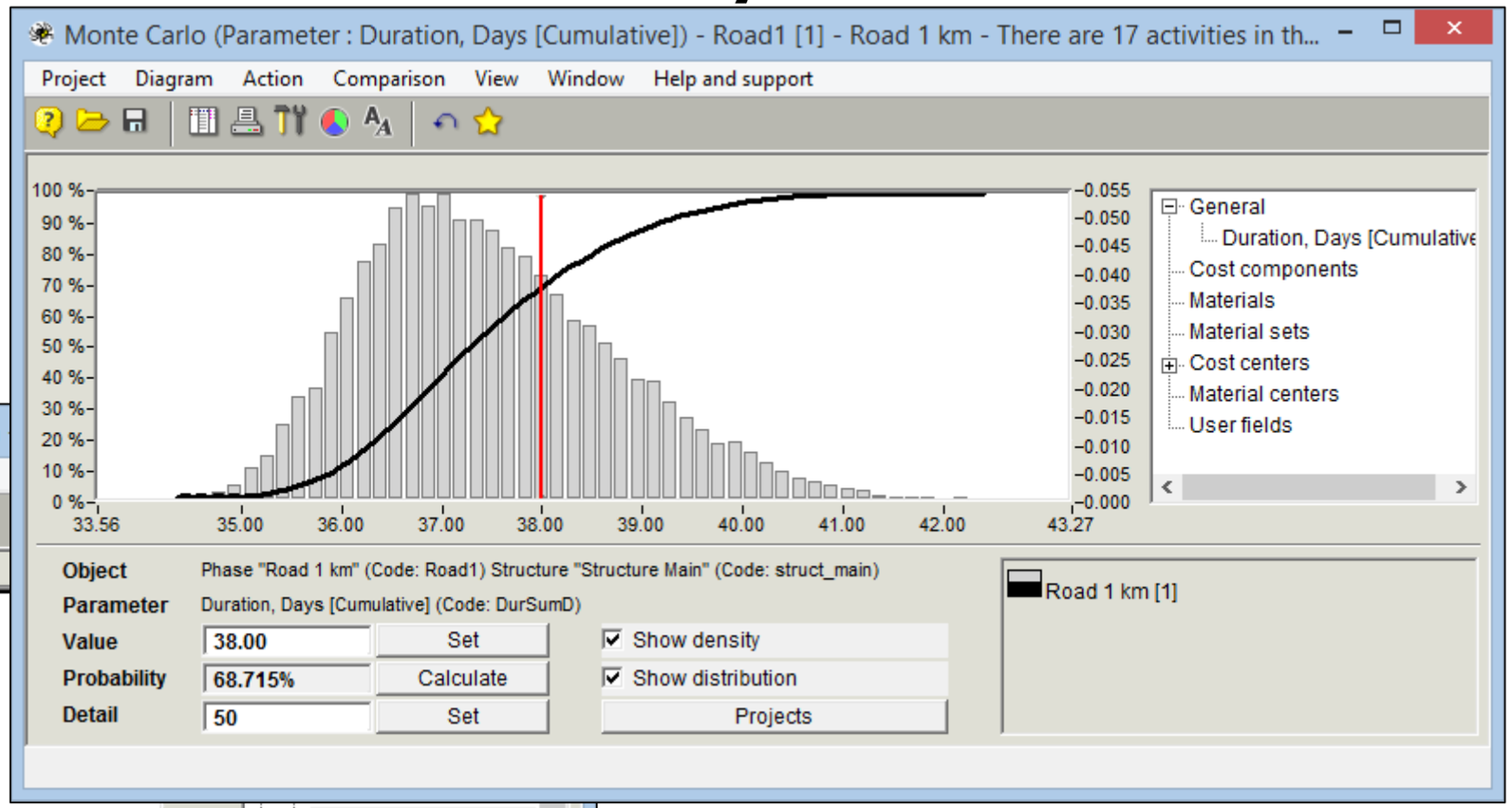
In the Monte Carlo risk analysis dialog, we can select which probability distributions to calculate, which initial data distributions to use, the number of iterations, etc.

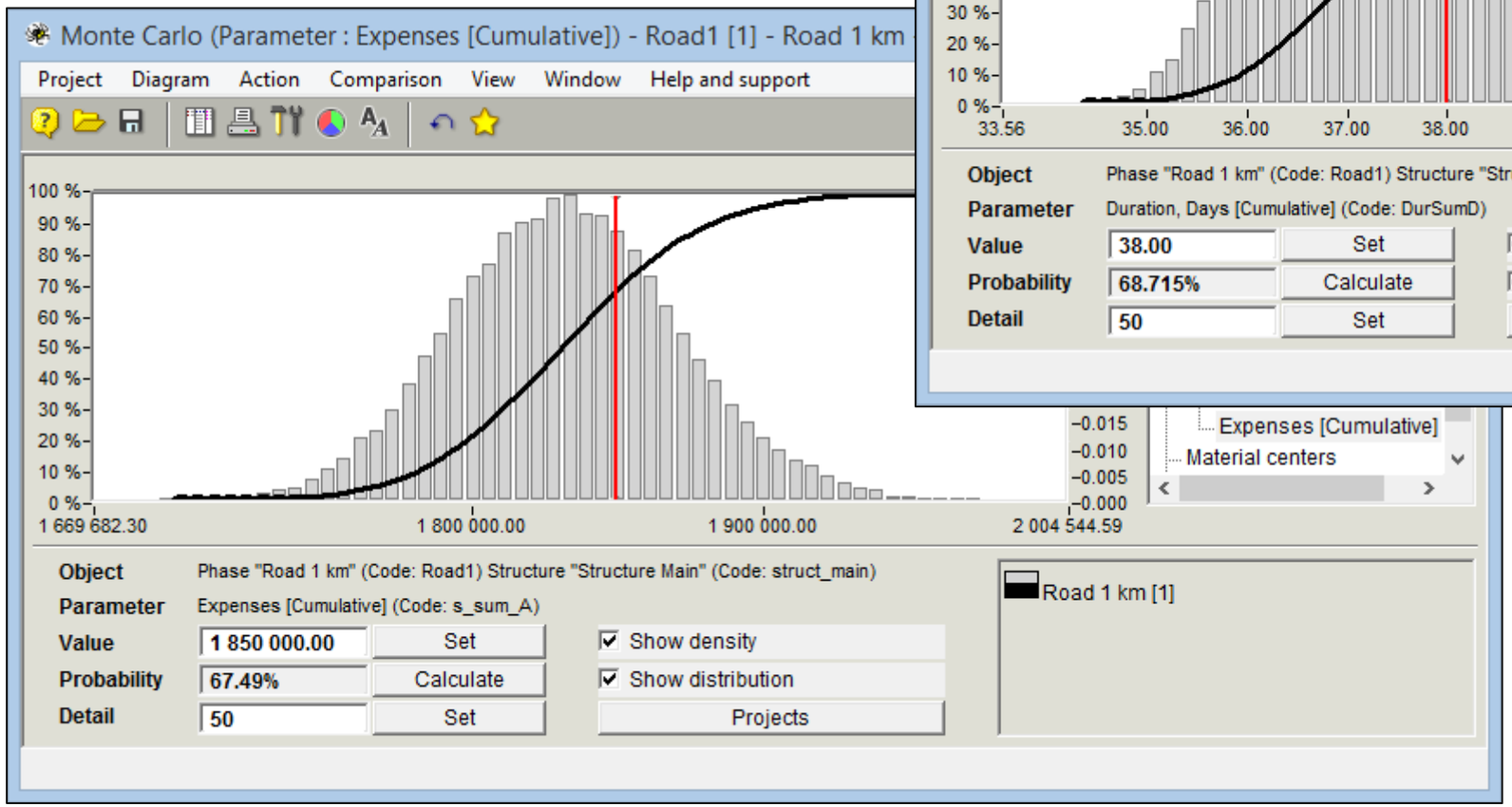
In Spider Project, the Monte Carlo simulation takes into account all time, resource, material, and cost constraints, which makes Monte Carlo Risk Analysis in Spider Project outstanding.



MC Risk Simulation: Probability Curves

It looks reasonable to set project target duration and cost that have sifficient probabilities to be met.

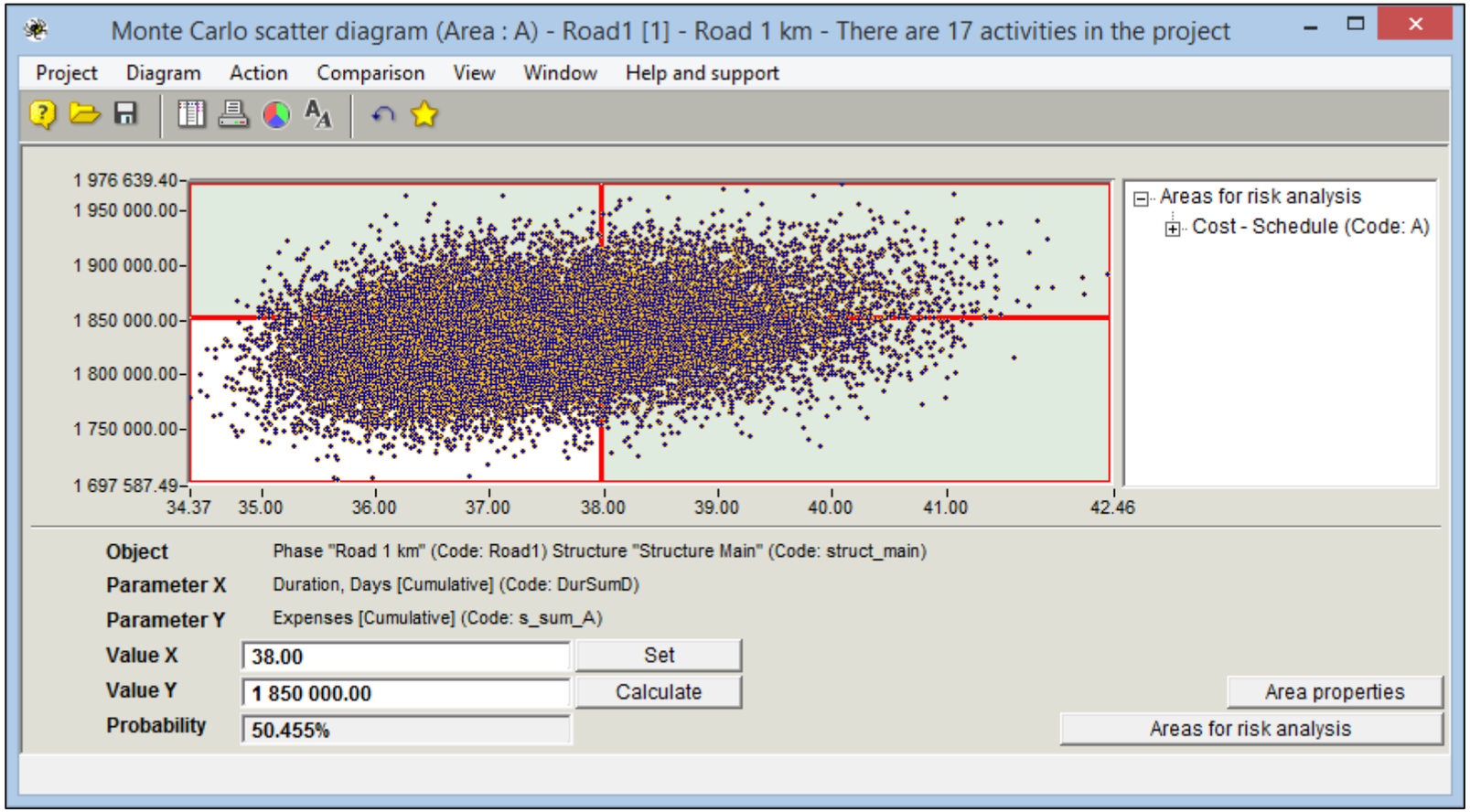




So we set target duration 38 days adding 1.36 days buffer and target cost 1.85 mln adding almost 60 000 buffer. Probabilities to meet these targets exceeds 67% that looks sufficient.

MC Risk Simulation: Scatter Diagram

However, the probability of meeting both targets is only 50.5%.
With many targets the probability to meet all of them is much lower than the probabilities to meet separate targets. We recommend to set one integrated project success criterion instead of setting many criteria.



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.

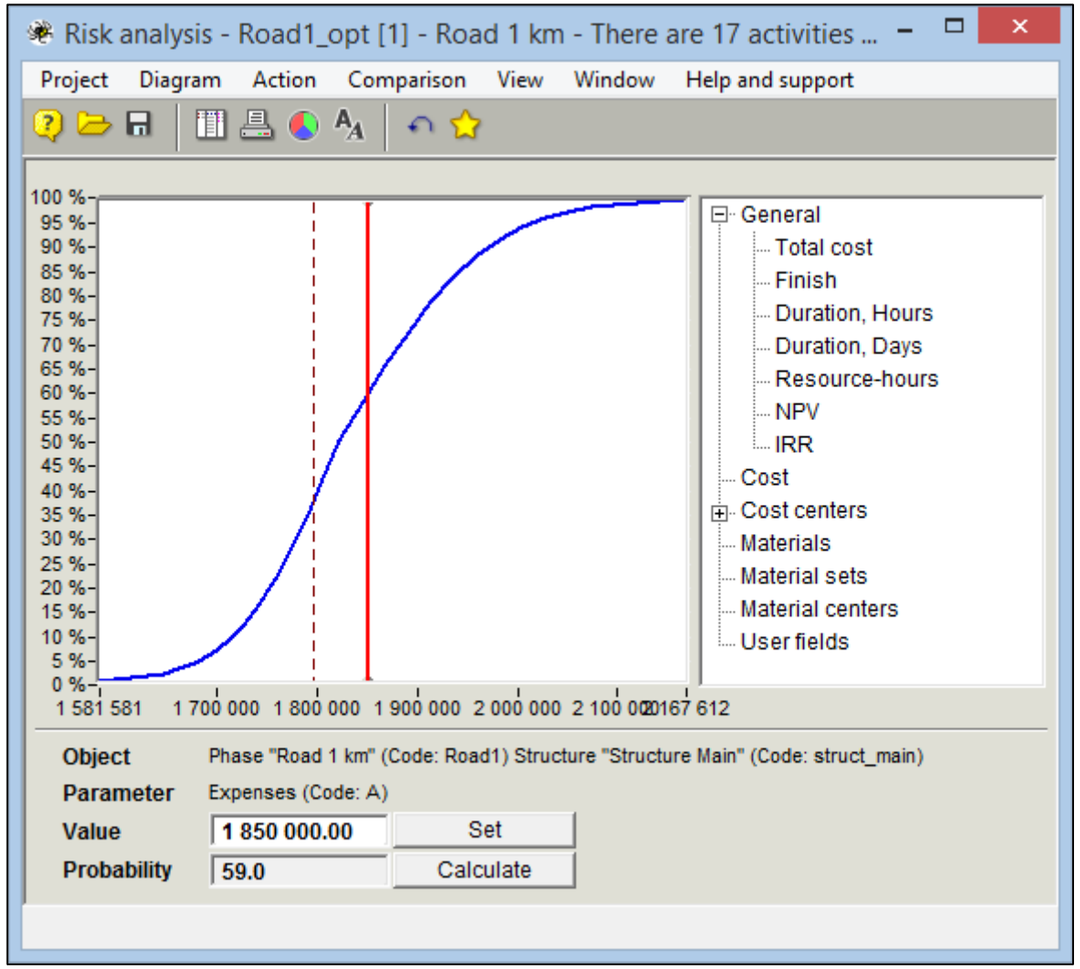
Targets may be set, based on the required probabilities of achieving.

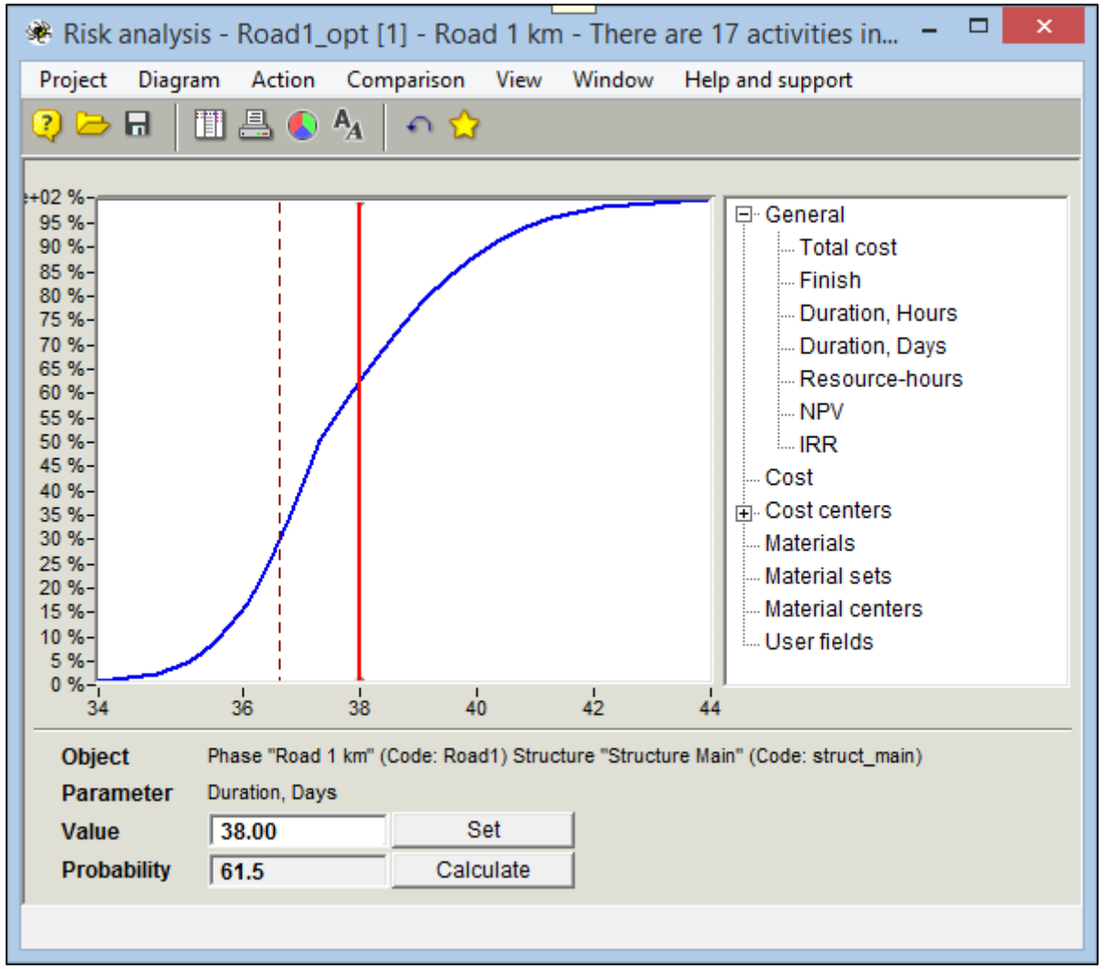
However, target dates and costs can be also set from the start. In this case, Spider Project will calculate the probabilities of meeting these targets.

If Monte Carlo risk model was created three scenarios of project execution can be created automatically, otherwise they must be created manually.

3 Scenarios Risk Simulation

3 scenarios probability curves are intentionally wider than created for the same project by Monte Carlo simulation. It helps to better recognizing of success probability trends.





3 Scenarios Risk Simulation

We recommend to use the optimistic project version for managing project workforce and to estimate 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 these feature to manage 3 following schedules in parallel:

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

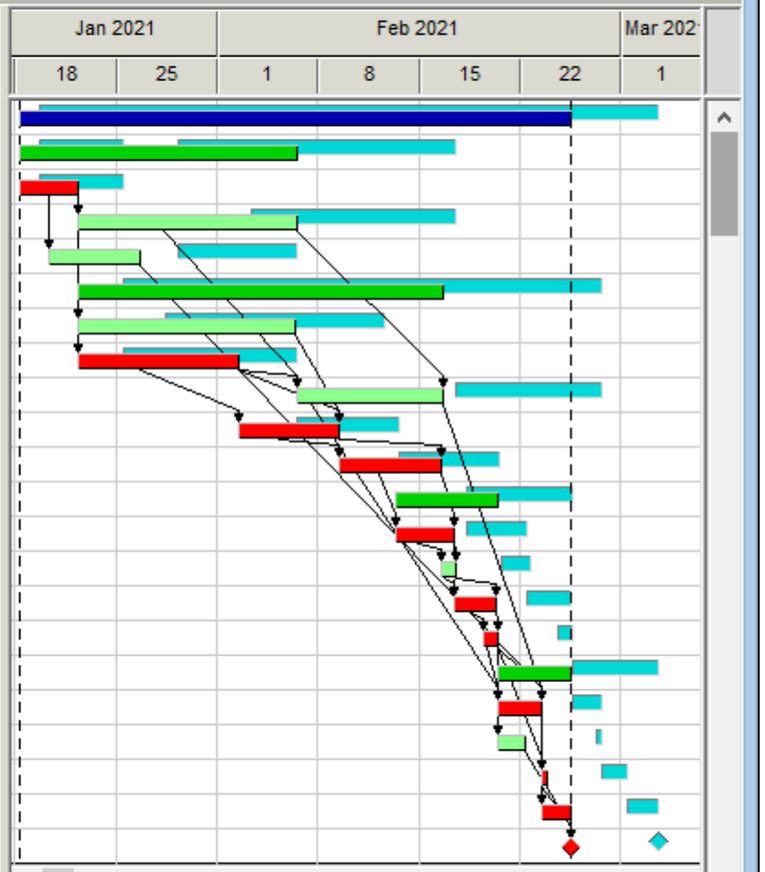
Optimistic schedule

Activity Gantt - Road1_opt [1] - Road 1 km - There are 17 activities in the project

Project Gantt Action Filter Calculation Risk analysis Reports and diagrams Comparison View Window Help and support

Activities | Structure Main (Code: struct_main) | Productivity

	Name	Duration, Days	Expenses [Remaining]	Start	Finish
1	Road 1 km	33.52	1 581 580.85	18.01.21 08:00	25.02.21 13:14
2	DRAINAGE	17.50	291 231.17	18.01.21 08:00	06.02.21 13:00
3	Drainage Layout	4.17	37 916.67	18.01.21 08:00	22.01.21 09:40
4	Drainage system construction	13.33	189 800.00	22.01.21 09:40	06.02.21 13:00
5	Retention Pond	5.71	63 514.51	20.01.21 08:50	26.01.21 15:58
6	BASE	21.67	851 271.47	22.01.21 09:40	16.02.21 16:20
7	Sand and Crush Stone Transportation	13.20	203 150.00	22.01.21 09:40	06.02.21 11:40
8	Road Layout	9.23	84 000.08	22.01.21 09:40	02.02.21 11:58
9	Trench Excavation	8.33	115 916.67	06.02.21 13:00	16.02.21 16:20
10	Sand Bed	6.06	212 727.36	02.02.21 11:58	09.02.21 12:34
11	Stone Bed	6.06	235 477.36	09.02.21 12:34	16.02.21 13:11
12	SURFACE	6.19	246 292.80	13.02.21 09:11	20.02.21 11:06
13	Prime Coat	3.00	22 620.00	13.02.21 09:11	17.02.21 09:11
14	Black Base	0.96	100 526.40	16.02.21 13:11	17.02.21 12:47
15	Tack Coat	3.00	22 620.00	17.02.21 09:11	20.02.21 09:11
16	Bituminous Concrete Surface Wearing Course	0.96	100 526.40	19.02.21 11:30	20.02.21 11:06
17	UTILITIES	4.21	192 785.40	20.02.21 11:06	25.02.21 13:14
18	Roadsides	2.00	44 265.00	20.02.21 11:06	23.02.21 11:06
19	Marking-out	0.80	9 100.00	20.02.21 11:06	22.02.21 09:06
20	Traffic signs	0.21	3 050.40	23.02.21 11:06	23.02.21 13:14
21	Barriers	2.00	136 370.00	23.02.21 13:14	25.02.21 13:14
22	Finish			25.02.21 13:14	25.02.21 13:14



Project Budgets | Expenses 2 185 000.00

Filter - | 0 rows selected | Filter on links -

Blue “critical” schedule shows time buffers for the dates of individual activities and phases of our project.

Schedule Analysis Tools

Spider Project includes many tools for schedule analysis and improvement:

- Resource constrained floats and Resource Critical Path
- Critical activity Drags
- Activity Flexes
- Predefined Filters:
    - Activities without successors
    - Activities without predecessors
    - All activities preceding the selected activities
    - All activities succeeding the selected activities
    - Activities that use certain resources and skills
- Any filter for project dependencies, etc.
- Schedule Statistics Report shows all potential problems with the project model

Schedule Statistics

Schedule_statistics [1] - Schedule stat...

Document Table Action Filter Comparison Window
Help and support

	Parameter	Quantity	%
1	Activities		
2	Total	17.00	100.00
3	Duration	1.00	5.88
4	Productivity	15.00	88.24
5	Milestone	1.00	5.88
6	Hammock	0.00	0.00
7	Switch	0.00	0.00
8	Trigger	0.00	0.00
9	ALAP	0.00	0.00
10	Duration exceeds 5 work days	7.00	41.18
11	Duration exceeds 10 work days	2.00	11.76
12	Duration exceeds 22 work days	0.00	0.00
13	Duration exceeds 44 work days	0.00	0.00
14	Critical	11.00	64.71
15	Total float less than 1 work days	12.00	70.59
16	Total float less than 5 work days	14.00	82.35
17	Positive free float	4.00	23.53
18	Negative float	0.00	0.00
19	Peak negative float in days		
20	Without predecessors	1.00	5.88
21	Without predecessors to start	1.00	5.88
22	Without successors	1.00	5.88
23	Without successors from finish	1.00	5.88
24	Resources loaded	16.00	94.12
25	Materials loaded	15.00	88.24
26	Cost loaded	16.00	94.12
27	With date constraints	0.00	0.00
28	Start [NET]	0.00	0.00

Filter -

Schedule_statistics [1] - Schedule stat...

Document Table Action Filter Comparison Window
Help and support

	Parameter	Quantity	%
27	With date constraints	0.00	0.00
28	Start [NET]	0.00	0.00
29	Finish [NLT]	0.00	0.00
30	Finished	0.00	0.00
31	Finished out of sequence	0.00	0.00
32	In progress	0.00	0.00
33	In progress out of sequence	0.00	0.00
34			
35	Links		
36	Total	34.00	100.00
37	Finish-Start	13.00	38.24
38	Start-Start	10.00	29.41
39	Finish-Finish	11.00	32.35
40	Start-Finish	0.00	0.00
41	Double lag	0.00	0.00
42	Strict	0.00	0.00
43	With volume lags	19.00	55.88
44	With time lags	1.00	2.94
45	With negative lags	0.00	0.00
46	With lags exceeded 5 work days	1.00	2.94
47	With lags exceeded 10 work day:	0.00	0.00
48	With lags exceeded 22 work day:	0.00	0.00
49	With lags exceeded 44 work day:	0.00	0.00
50	Broken	0.00	0.00
51			
52	Resources		
53	Available quantity	51.00	100.00
54	Assigned quantity	45.00	88.24

Filter -

Schedule_statistics [1] - Schedule stat...

Document Table Action Filter Comparison Window
Help and support

	Parameter	Quantity	%
41	Double lag	0.00	0.00
42	Strict	0.00	0.00
43	With volume lags	19.00	55.88
44	With time lags	1.00	2.94
45	With negative lags	0.00	0.00
46	With lags exceeded 5 work days	1.00	2.94
47	With lags exceeded 10 work day:	0.00	0.00
48	With lags exceeded 22 work day:	0.00	0.00
49	With lags exceeded 44 work day:	0.00	0.00
50	Broken	0.00	0.00
51			
52	Resources		
53	Available quantity	51.00	100.00
54	Assigned quantity	45.00	88.24
55	Available resource-hours	18 685.28	100.00
56	Assigned resource-hours	8 817.24	47.19
57	Remaining available resource-h	18 685.28	100.00
58	Remaining assigned resource-h	8 817.24	47.19
59			
60	Materials		
61	Total	8.00	100.00
62			
63	Project registry		
64	Total	1.00	100.00

Filter -

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 based on their skills, cost and productivity

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 can 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 can be discussed in other presentations.


THANK YOU!
Questions?