

Project management development in Russia - achievements and lessons learned

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Introduction

Project management is a global profession today. Increasingly more projects become international and project managers from the different countries need to share terminology to speak the same language, to share experience and approaches to be able to work together, and to learn about cultural differences for better understanding of each other. Unfortunately project management development in Russia remains terra incognita for most project management professionals although there are many areas where Russian project management methods and tools are more effective than others.

The development of modern project management methods and tools in Russia has a long history. There were many large-scale projects demanding the coordination of resources and organizations involved. Time requirements were always pressing and resources limited. There were many high-skilled mathematicians and programmers who developed sophisticated algorithms and programs for project scheduling and resource management but the USSR economical system was not suited for their use. There were many reasons for that, particularly, the lack of competition and the lack of personal interest in achieving better results. In other words - projects had no owners who would be interested in money and resource saving.

The situation changed rapidly following the political changes. Now the projects have owners, there is competition, and the need for proper project management is very urgent. PM has been reinvented and now it is different from the old PM - we manage not only the resources and time but also cost, contracts, risks, communications, etc.

We have learned about project management methods and tools used abroad and discovered that there are many things that we did differently, that some of our commonly used approaches are more effective than those used in other countries. Joining PMI and the world PM provided us with an opportunity to discuss our problems with the PM professionals in other countries, to discover the solutions to these problems developed elsewhere, and to offer others solutions developed in Russia. Joining PMI and the world PM community stimulates the development of the methods and tools that are competitive and the usage of the world project management experience.

Our “lessons learned”:

NF= One should be familiar with the international terminology, approaches, methods and tools to be able to create international project management teams speaking the same professional language, although without the proper adjustments the international approaches will not work locally.

OF= We have negative experience of the American PM software usage - our approaches are different and the functional requirements of Russian project managers are much higher.

PF= PMI certification opens great opportunities for project managers. It induces the Russian project managers to learn *A Guide to the PMBOK®* and the project management glossary used throughout the world.

We have redesigned accepted PM standards (*A PMBOK Guide®*) for the usage in Russia, developed our own PM software and applied both the former and the latter in some projects that received good press coverage, like construction of Olympic Village for the first International Youth Games in Moscow in 1998. We began to implement PM methods and tools in this project at the moment when the project was two months behind the schedule. The construction was finished two months ahead of the initial schedule. The advantages of PM methods and tools were so obvious that many companies involved in Olympic village construction project began to use PM technology in other projects with the very impressive results (up to 40% acceleration of the rate of construction). Now there is a queue of companies that want to use our services in implementing PM technology. Moscow PMI Chapter provides regular PM courses, several Russian Universities offer the courses in PM and there is a great shortage of PM specialists in Russia.

Project management technology proved its efficiency and the demand for its application grows very fast especially in those industries where the competition is high. In Russia it is mostly telecommunications, software development, construction.

Adaptation of A PMBOK Guide®

A *PMBOK Guide*® has a matrix structure (areas and processes) with PM knowledge areas as the main division lines. Those who tried to learn about PM through *A PMBOK Guide*® could be confused by the proposed set of separate knowledge areas that, in fact, should not be separated. In the Russian counterpart of the PMBOK Guide, *The Outlines of Project Management*, the contents of *A PMBOK Guide*® was reorganized in a more instructive process-oriented way. We defined six main PM processes instead of five. The additional process is the **Analysis** as follows from Exhibit 1. PM functions used in these processes vary significantly. For example, cost analysis is very important but cost control can be achieved only through other management tools.

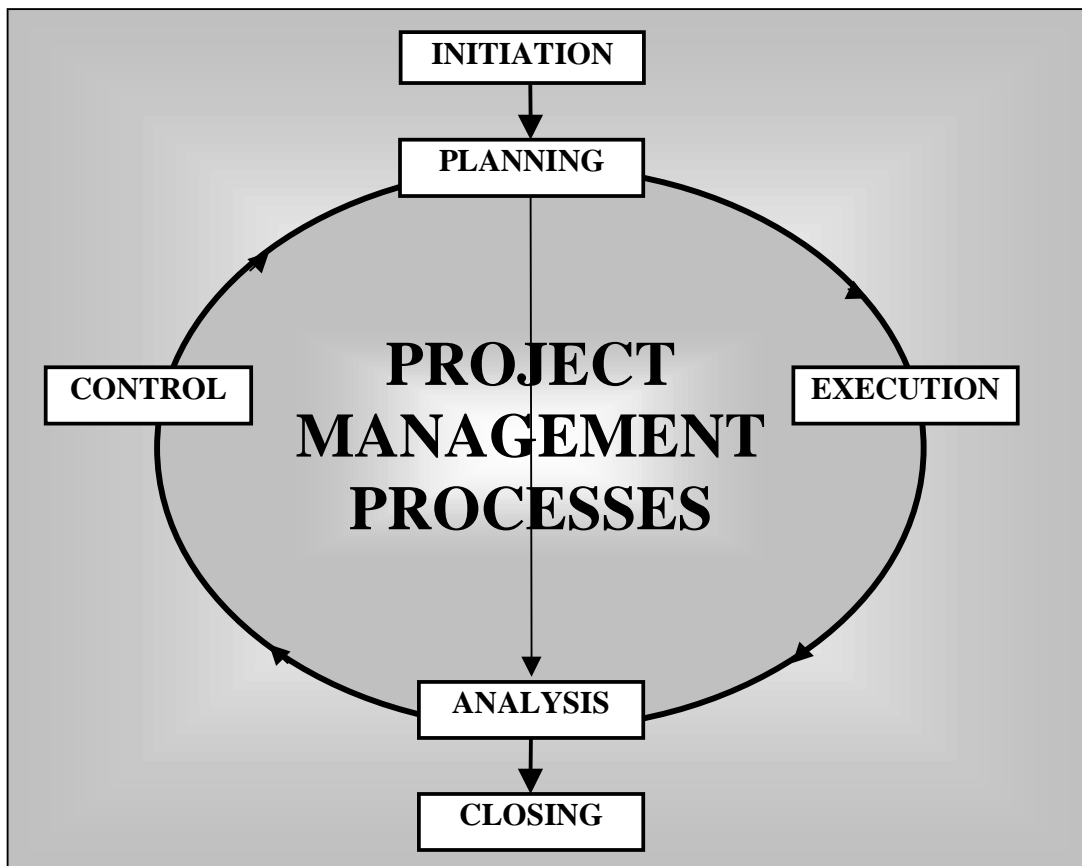


Exhibit 1. Project Management Processes.

The current content of *A PMBOK Guide*® can be successfully applied to project estimations, planning and control only at such management levels where the details are not important. However it does not provide fine enough tools for more precise project management (essential, for instance, at the lower levels of organizational structure) for which the resource management is the core issue. Description of PM technology could not be complete without including resource management as a core separate entity.

In *A PMBOK Guide*®, the processes of *Analysis* are included in the processes of *Control*. We cannot agree with this approach because the objects of analysis and control are different. For instance, cost analysis. Costs cannot be influenced directly; other means should be used to improve cost performance, such as resources or scope.

Another difference between our approaches is the role for resource management in the processes of project management. In *The Outlines* we paid much more attention to resource management. Resource analysis and resource control have no counterparts in *A PMBOK Guide*®.

Project planning in Russia (particularly, in the construction industry) is traditionally based on the federal, local, industrial or corporate norms and standards. These norms usually refer to resource productivity, costs and materials per unit of activity volume (volume of work to be done). Usage of these norms affects the planning of activities. Activity Duration Estimating of *A PMBOK Guide*® doesn't support this approach. Actually *A PMBOK Guide*® does not even employ the concept of activity volumes. Estimations of activity volumes are associated with resource planning, cost estimation, staff acquisition, solicitation planning, schedule development, cost budgeting and project plan development.

The main difference between the approaches may be summarized in the following statement: if you use activity volumes and resource productivity as the inputs in planning processes, activity duration may be estimated only after the assigned resources were chosen and project schedule calculated. Even if activity duration is known, resource assignments and requirements should be defined. You can estimate activity cost without project scheduling only if there is no choice of resources to be used. Now, while many PM software packages support skill scheduling, it is natural to estimate activity costs after project scheduling. In some projects resource rates may depend on time, interest charges may also be used. It also means that project scheduling should precede activity cost estimating.

Resource analysis is an essential part of project execution analysis. Productivity of assigned resources defines activity and project duration. It is vital for project time analysis to be able to forecast resource productivity. The monitoring of actual resource performance allows to forecast trends and future resource productivity. Such analysis is quite useful for estimating schedule performance and forecasting project duration. The usage of project resources varies at the different project phases and the forecasting that accounts for these differences is considerably more accurate than the methods of Earned Value Analysis.

Methods of risk analysis (PERT, Monte Carlo) should include estimations and simulations of activity volumes, resource productivity, resource availability, etc. The main problem with the methods described in *A PMBOK Guide*® and offered by American risk simulating software is their initial assumption that cost and duration deviations of different activities are independent of each other. Actually, it's wrong. Activities performed by the same resources have correlated duration and not taking it into consideration leads to producing wrong risk simulation results. Besides, activity and resource calendars should be used for the simulation of risk events. We simulate resource productivity and it makes our approach to risk simulation much more accurate.

There are other sections of *A PMBOK Guide* that have to be expanded if resource management processes are to be considered. We cannot discuss all of them in this presentation but I hope that the way it should be done is quite evident.

Advanced features of Russian project management software

In this section we will describe a few differences between the project management approaches supported by Russian project management software Spider Project and widely used in Russia and those described in *A PMBOK Guide*®.

Multiple Hierarchical Breakdown Structures

Spider Project users can create and use simultaneously an unlimited number of different Work and Resource breakdown structures in the same project. We consider this feature to be of key importance and the debates revolving about the question of optimal breakdown structure - pointless. Therefore we cannot understand the goals of the group in the PMI Standards Committee elaborating the recommendations on optimal project breakdown structures. The use of multiple breakdown structures allows not only to obtain the different project reports as seen from the different standpoints, but also to control if the project model is truly comprehensive.

In our projects we commonly use at least three Work breakdown structures based on project objectives, project processes and responsibilities of implementers. It should be stressed that the structure of responsibilities successfully substitutes for the responsibility matrix that is usually elaborated as part of the project plan. Responsibilities are usually distributed hierarchically and only in small projects the responsibility structure becomes flat and can be reduced to a matrix. Besides that, Spider Project can also create other Work breakdown structures, including the incomplete ones (not containing all project activities). Incomplete structures provide a useful tool for preparation of reports and analysis of particular aspects of the project. The examples of such incomplete structures are the structure of deliveries, which includes only the activities associated with delivery of materials, the milestone structure including only the milestone events of the project (Milestone schedule).

At PMI'98 (Long Beach) I participated in the Standard Committee session discussing WBS standards. Our discussion was later continued through the Internet. Dr Robert Youker had sent to the members of the WBS group a sample project perfect for WBS discussion:

- Situation:** At a local party a group of neighbors agreed to organize and establish a community swimming pool.
- Objective:** To establish a community swimming pool including both physical facilities and organization to operate the system.

The following captures of Spider Project screens show different WBS intended for project planning and control.

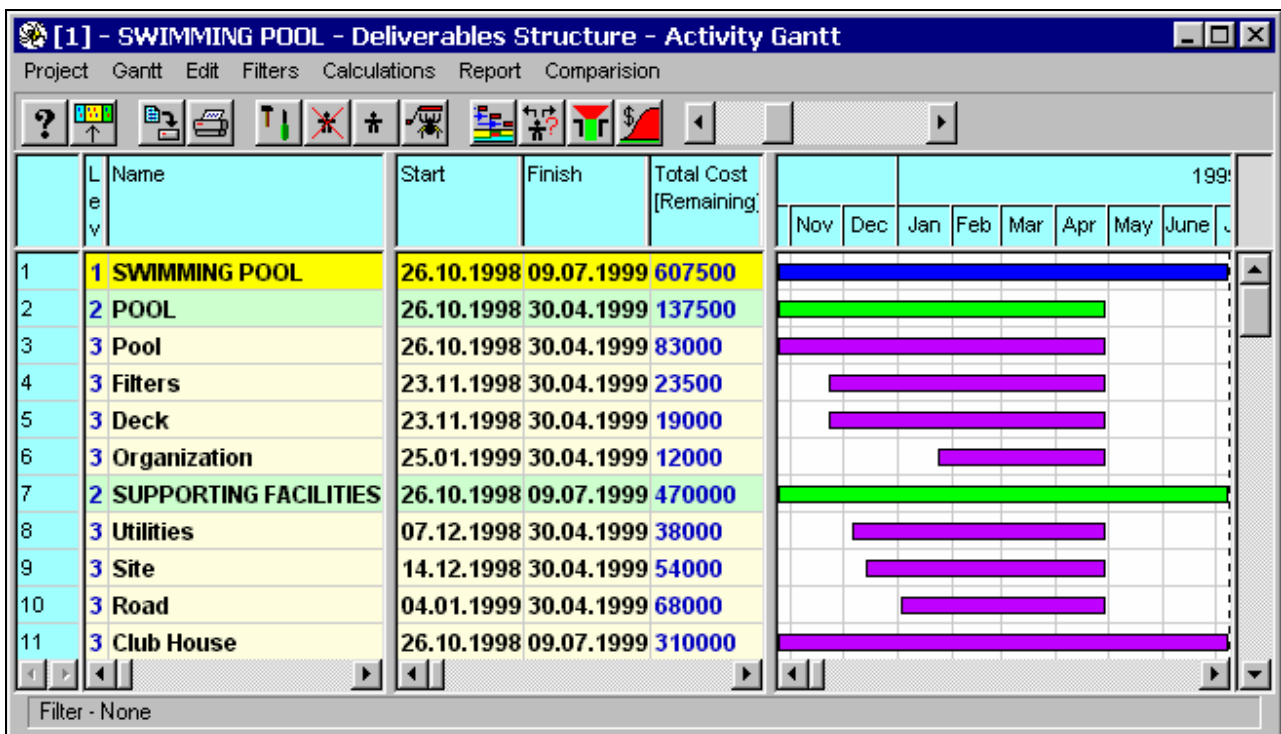


Exhibit 2. Deliverables WBS for Swimming pool project.

Exhibit 2 shows *Deliverables (or Object) WBS*. Using this structure we can obtain the reports on cost and resource requirements of project objects (or deliverables).

The following example shows the object structure of project budget.

Level	Name	Oct 98	Nov 98	Dec 98	Jan 99	Feb 99	Mar 99	Apr 99	May 99	June 99	July 99
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3	POOL	1250	7700	10500	11000	12500	12500	12500	12500	12500	12500
3	SUPPORTING FACILITIES	1667	8667	19667	25000	25000	25000	25000	25000	25000	25000
2	DESIGN		3000	33500	87000	100000	100000	100000	100000	100000	100000
3	POOL		3000	14500	25000	25000	25000	25000	25000	25000	25000
3	SUPPORTING FACILITIES			19000	62000	75000	75000	75000	75000	75000	75000
2	BID				5000	20000	25000	25000	25000	25000	25000
3	POOL				5000	5000	5000	5000	5000	5000	5000
3	SUPPORTING FACILITIES					15000	20000	20000	20000	20000	20000
2	CONSTRUCT				4286	25429	132476	306111	364444	425556	445000
3	POOL				4286	21429	41143	95000	95000	95000	95000
3	SUPPORTING FACILITIES					4000	91333	211111	269444	330556	350000

Exhibit 5. Cumulative project cost (process view).

Exhibit 6 shows *Responsibility WBS*. In our projects we use *Responsibility structure* instead of *Responsibility matrix* described in *A PMBOK Guide®*. *Responsibility matrix* is “flat” and cannot describe hierarchical responsibilities. *Responsibility structure* helps not only to plan responsibilities but also to track, control and analyze personnel performance.

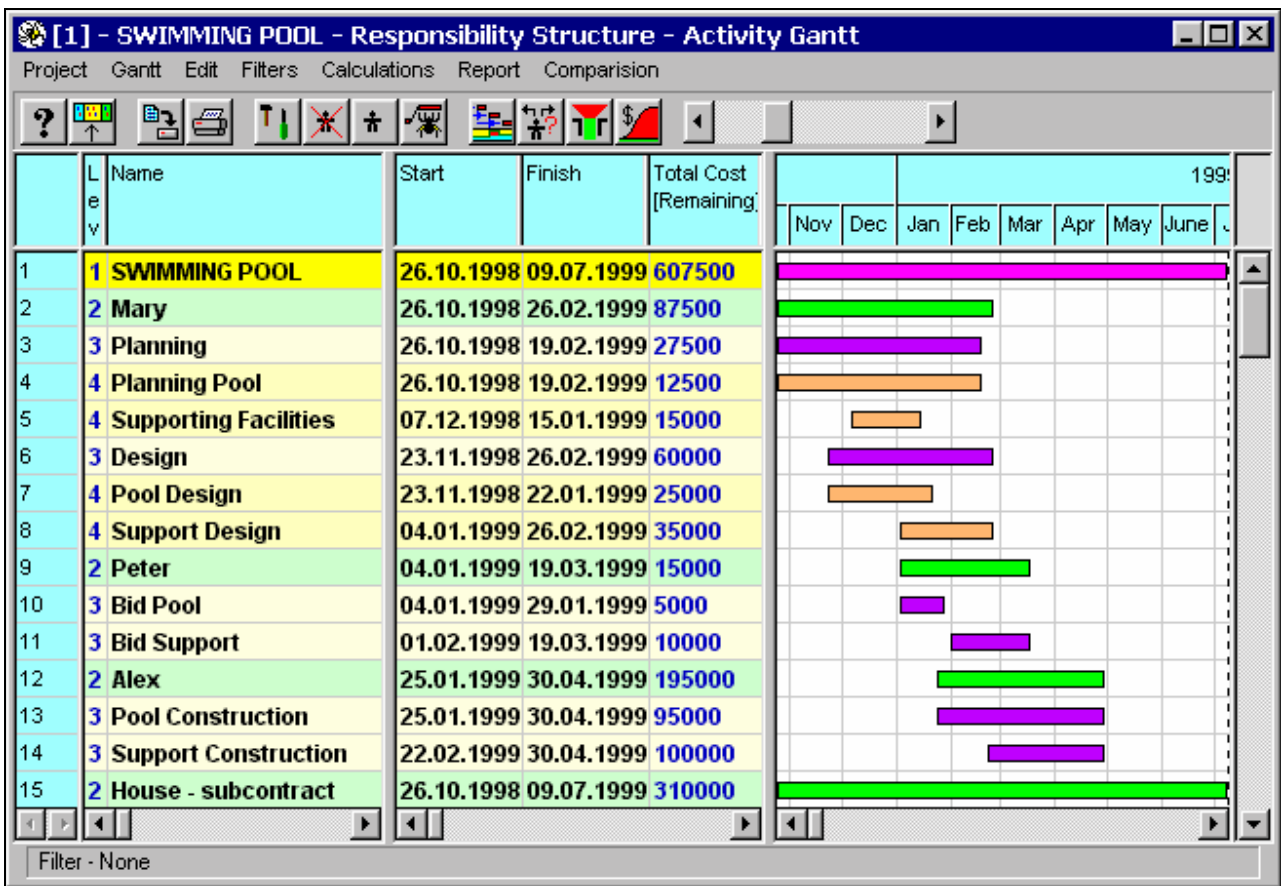


Exhibit 6. Responsibility WBS for Swimming pool project.

Using this structure we can obtain reports on cost and resource plans for managers of subprojects. The following report shows the subproject structure of project budget.

Level	Name	Oct 98	Nov 98	Dec 98	Jan 99	Feb 99	Mar 99	Apr 99	May 99	June 99	July 99
1	SWIMMING POOL	2917	19367	63667	132286	182929	294976	468611	526944	588056	607500

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2	Mary	1250	10700	34667	73000	87500	87500	87500	87500	87500	87500
3	Planning	1250	7700	20167	26000	27500	27500	27500	27500	27500	27500
3	Design		3000	14500	47000	60000	60000	60000	60000	60000	60000
2	Peter				5000	12000	15000	15000	15000	15000	15000
3	Bid Pool				5000	5000	5000	5000	5000	5000	5000
3	Bid Support					7000	10000	10000	10000	10000	10000
2	Alex				4286	25429	82476	195000	195000	195000	195000
3	Pool Construction				4286	21429	41143	95000	95000	95000	95000
3	Support Construction					4000	41333	100000	100000	100000	100000
2	House - subcontract	1667	8667	29000	50000	58000	110000	171111	229444	290556	310000

Exhibit 7. Cumulative project cost (responsibility view).

Employing multiple WBS allows managers to obtain more information for the control of their projects and project management teams. Project managers can plan and analyze expenses and resource requirements by deliverables, by life cycle phases, by responsibilities and by any other WBS if necessary.

The use of multiple Resource Breakdown Structures is especially important in multiproject management. In this case the matrix organizational structure determines the necessity of obtaining the reports on both project and functional Resource Breakdown Structures.

Resource Critical Path

Traditional critical path method works only in case of unlimited resource availability. If resources are limited, traditional methods of critical path determination cannot be applied. The same is true for the total float concept. The total float determined by American PM packages shows the time reserve for the execution of activity, with the limitations on the amount of available resources ignored. Such time reserves cannot be used in practice.

By way of example let us consider a simple project consisting of only three activities, with the two of them having the planned duration of ten days, with the planned duration of the third activity of fifteen days. The first two activities need resource A to be executed, while the third activity needs resource B. If these activities are not interdependent, the third is critical in its classical sense, while the first two have a 5-days total float (Exhibit 8).

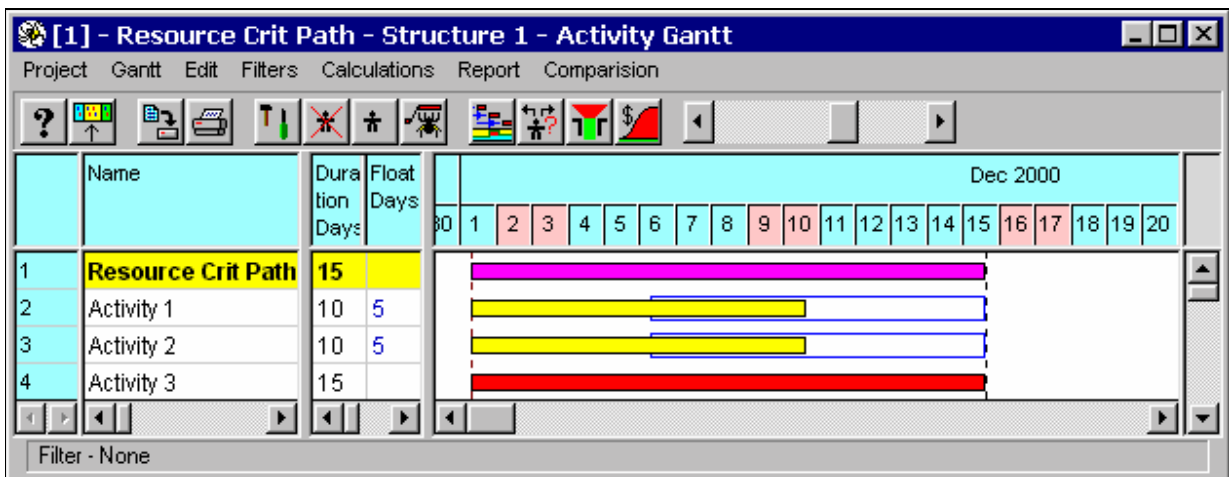


Exhibit 8. Critical Path and activity resource floats before leveling.

However if the schedule is calculated taking into consideration that only one unit of each resource is available, the first two activities can only be executed one after another, and a 5-days float emerges for the third activity (Exhibit 9).

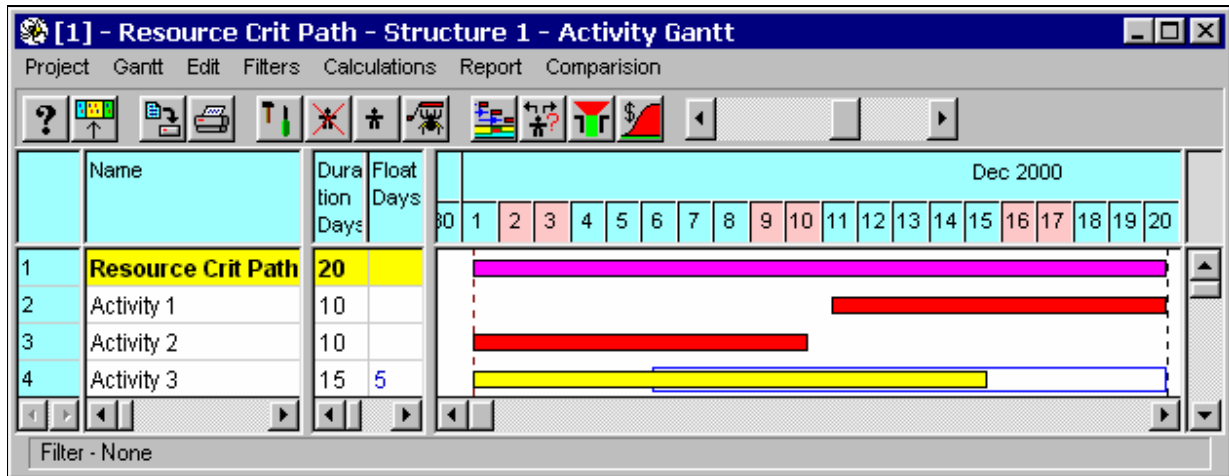


Exhibit 9. Resource Critical Path and activity resource floats after leveling.

Therefore Spider Project calculates resource critical path and the activity floats with resource limitations taken into consideration (resource floats). We put forward this concept in our presentations at PMI conferences and IPMA congress in Paris in 1996 and we are glad that resource critical path presently began to receive consideration.

Resource Critical Path and Critical Chain

We were not particularly impressed by the Critical Chain theory. This theory offers a number of reasonable techniques but none of them are new to us. On the other hand, it includes the assumptions that are seldom true and the recommendations that should not be followed. Let's consider the main principles of Critical Chain theory and compare them with our approaches.

We never came across a clear description of the Critical Chain calculation. We believe that the best critical chain is our resource critical path that Spider Project calculates since 1993. We have a vast experience of working with resource critical path and we know that the assumption that the critical chain never changes during project execution is certainly wrong.

According to Critical Chain theory activity completion times should be estimated at 50% confidence points and project buffer should be put at the end of the project to protect completion schedule. We usually employ tougher estimates and calculate time reserves (time buffers) as described further.

Spider Project technology of project management includes the following main steps:

- 1) Assessment of risks and creation of optimistic, pessimistic and expected estimations of activity duration and volumes, resource productivity and quantity, activity and resource cost, calendars, etc. Estimates are usually based not only on expert judgement but also on state or corporate norms;
- 2) Calculation of expected resource and cost constrained project schedule and risk simulation;
- 3) Calculation of the project and each phase target finish dates (usually with 65-75% probability of timely execution);
- 4) Calculation of optimistic resource constrained schedule and resource critical path that successfully substitutes critical chain and is easier to understand;
- 5) Calculation of target schedule with the optimistic activity duration but target finish dates (backward schedule);
- 6) Usage of the optimistic schedule as a plan for the employees. The difference between activity start dates in optimistic and target schedules is time reserve for management (time buffer);
- 7) Risk control and regular recalculation of necessary time buffers.

Exhibit 10 shows an example of time buffers as we use them. Using optimistic estimates, we increase our chances to obtain the reports on any deviations from the proper activity execution. This information is necessary for quality and risk analysis.

We agree with Critical Chain theory that project managers should control activity reserves and we do it all the time.

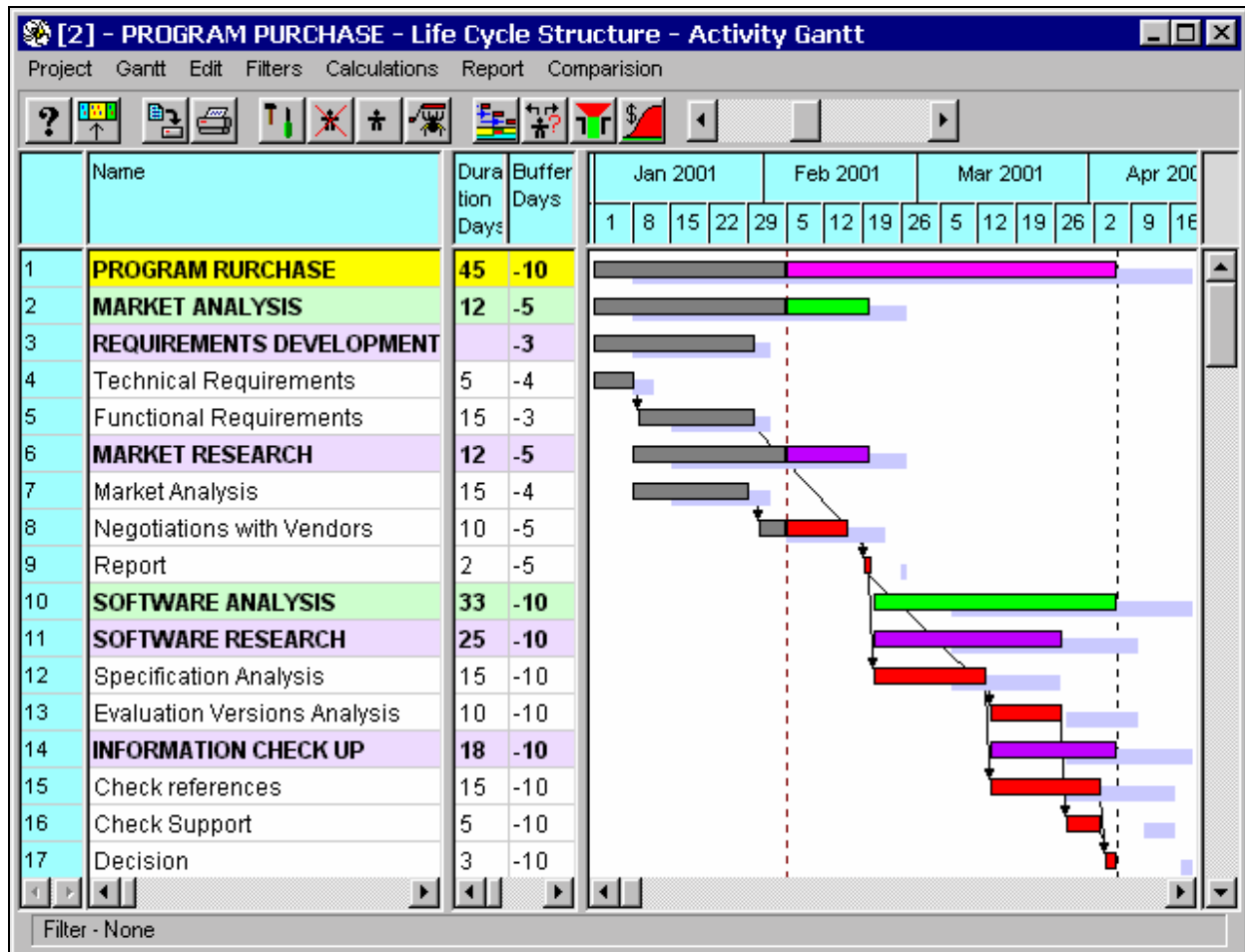


Exhibit 10. The example of time buffers calculation.

One of the dubious assumptions of Critical Chain theory is the existence of drum resource. In some projects only one resource is critical, in others several resources are critical. What you have to do to minimize project expenses is to create project resource pool where most resources are critical.

An example of CCPM dubious proposal: to avoid multitasking. The following example (Exhibit 11) shows the sample project schedule containing activity 2 planned to be interrupted for better usage of project resources. You can choose another option: to delay the execution of activity 4 and avoid multitasking increasing project duration by 22 days. We don't think that it is the best solution.

We will not further compare Resource Critical Path approach with Critical Chain theory. For those who are familiar with this theory the examples above show that it does not offer anything new for the Russian project managers.

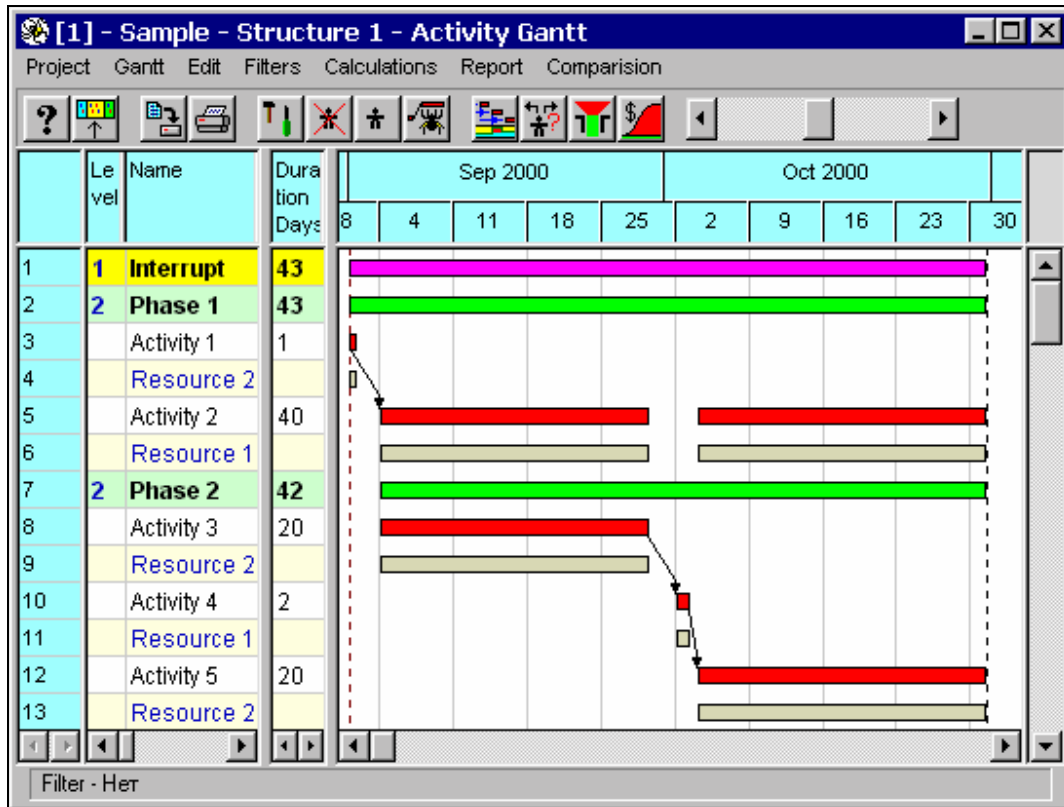


Exhibit 11. The sample project with interrupted activity performance.

Prospective trends in project management

The science of project management is rapidly developing in many countries and cultures. Project managers throughout the world know much more about the development of project management methods and tools in the USA than in the neighboring countries. Successful globalization of the project management profession depends on accumulation of global knowledge, approaches and tools and their integration in the common body of knowledge. Sharing our achievements and learning about the achievements of others we became richer, we increase our ability to be successful.

We anticipate the growth of interest in resource management that is obviously a weak point of known methods and tools. Our package Spider Project produces shorter resource constrained schedules and offers many more tools for resource work simulation than project management packages known in other countries. It shows that known project management tools neglect proper resource management which is a key to the project success.

The interest in risk management is growing rapidly. In this presentation we discussed some of the weak points of existing approaches. We expect that the development of risk management will capture resource work simulation.

What we didn't discuss in this presentation is organizational aspects of project management development. This is a very hot topic because increasingly more companies are integrating the project management component in their organizational structures and corporate culture.

We expect that project management profession will become truly global with the global standards that can be applied anywhere and global certification that will succeed the existing PMP exams. We believe that PMI will be the leader in this process. We hope that the European Chapters will become much more involved in this process than they are at the moment.