OR-AS Operations Research Applications and Solutions	Case Name: **Nut Mixing Station**	Sector	Construction (Industrial)	
	OR-AS Operations Research - Applications and Solutions www.or-as.be info@or-as.be	Baseline Schedule	Schedule with resources	
			Schedule with costs	
		Risk Analysis	Random simulation	
Submitted by	N/A		One of nine std. scenarios	
			User defined distributions	
Date	November 19, 2012	Project Control	Automatic tracking	
File Name	C2012-02 Nut Mixing Station.p2x		Tracking based on user input	

1. Project description

Project authenticity

The expansion of a food processing company by the build of a nut mixing station where chocolate can be mixed with nut paste.

The project consists of activity, resource and cost data that were obtained directly from the actual project owner.

2. Project properties

2.1. Baseline Schedule

General	
# Activities	47
Planned Duration (PD)	22 days*
Budget At Completion (BAC)	1,056,501 €
Renewable Resources	24
Consumable Resources	-

Network topology	
Serial/Parallel (SP)	17%
Activity Distribution (AD)	17%
Length of Arcs (LA)	0%
Topological Float (TF)	48%

* standard eight-hour working days

2.2. Risk Analysis

Random simulation by ProTrack was performed using the default symmetric triangular risk distribution profiles.

	Cost sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	14.5	11.1	1.0
CRI-rho	16.4	13.3	1.0
CRI-tau	24.6	20.8	1.9

	Resource sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	25.9	20.0	1.3
CRI-rho	28.0	19.7	1.0
CRI-tau	22.6	27.6	1.9

	Time sensitivity		
	avg [%]	std dev [%]	skew [-]
CI	19.1	38.9	1.6
SI	37.8	35.3	0.9
SSI	6.0	14.1	2.5
CRI-r	11.7	11.5	2.0
CRI-rho	11.9	12.1	1.8
CRI-tau	28.9	12.6	-0.1

2.3. Project Control

2.3.1. Simulated forecasting accuracy

The accuracy of time and cost forecasting methods has been evaluated based on Monte Carlo simulation runs using the risk profiles described in section “2.2. Risk Analysis”. Based on these risk profiles, the Mean Absolute Percentage Error (MAPE) and Mean Percentage Error (MPE) have been calculated to evaluate the expected accuracy of the time and cost predictions, EAC(t) and EAC, respectively.

Simulated EAC(t) accuracy		
method - PF	MAPE [%]	MPE [%]
PV - 1	17.6	17.4
PV - SPI	51.6	51.4
PV - SCI	51.6	51.5
ED - 1	60.5	60.3
ED - SPI	51.5	51.3
ED - SCI	51.5	51.3
ES - 1	20.7	20.6
ES - SPI(t)	33.8	33.7
ES - SCI(t)	33.9	33.8

Simulated EAC accuracy		
method (PF)	MAPE [%]	MPE [%]
1	0.1	0.0
CPI	0.3	0.0
SPI	33.7	33.7
SPI(t)	25.3	25.3
SCI	33.7	33.7
SCI(t)	25.4	25.4
0.8 CPI + 0.2 SPI	14.5	14.5
0.8 CPI + 0.2 SPI(t)	10.4	10.4

According to the MAPE values[1] the best performance for time forecasting can be expected from the unweighted Planned Value method. For cost forecasting the unweighted and CPI-weighted methods should yield the best results.

2.3.2. Tracking description

The user has not performed any project control and therefore no tracking periods have been defined. Tracking periods can now be generated automatically by ProTrack or by manually inputting tracking data period by period.

[1] The MAPE gives the best indication for the forecast accuracy (the lower the MAPE, the more accurate the method) since all deviations from the targeted real duration (real cost) are cumulated, whereas for the MPE underestimates can be compensated by overestimates and vice versa, possibly leading to an overly positive evaluation of a certain method. However, the MPE can provide useful information about the nature of the deviations, i.e. does the method rather underestimate or overestimate the real duration (real cost)?